

PCPlus CAMPAIGN

→ Let our resident legal expert fight your fight



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After qualifying as a solicitor, Roger Gann got suckered into the dark world of computer journalism and is now combining both these skills for your delight

This month, **Roger Gann** relates a Sony saga, tackles some Dell warranty gripes and congratulates the good guys out there

Sony CLIE saga

I don't know about you, but I have always associated the Sony brand with expectations of high levels of quality, good design and well-specified hardware. Perhaps this is what reader M Yacasan used to think, too. But, after what he experienced having splashed out on a CLIE PDA just over a year ago, we doubt he still feels the same way. This is what happened:

"I own a Sony CLIE TH55 PDA, which I bought back in March 2004. However, soon after I started using it, the problems started. The model crashed, several functions stopped working and then the unit died.

"The first thing I did was call the Sony support team. This was a really slow process and, on one occasion, I waited more than 35 minutes! Eventually, I managed to speak to someone who told me to do various things to the dead PDA in order to try and resurrect it. What I hadn't bargained for was the rudeness of the Sony support team member. I got various accusations including, 'This is the new model, sir. How has it become faulty? Have you dropped it?' I can't pretend that I wasn't annoyed by this, but finally he issued the ticket number, and arranged a collection date.

The problems worsen

"By 7 April, three parts in my CLIE PDA had been replaced. I did go on to use it for about another two months, but it soon crashed again. I returned it yet again to Sony, and this time five components were replaced. Then, in September, my CLIE broke again.

"This time, I spoke to the Support Team manager, and the gentleman did agree with me, but the only solution he could offer was for me to send it in again. I raised the possibility of being given a replacement, but Customer Services politely declined my request!

"The repairs involved the same two initial parts being replaced. And to give you some idea of how many repairs have happened, one part has now

been replaced three times. Just before Christmas 2004, it failed again. This time, it was the battery that caused the problem. And it went on to fail one final time in February 2005.

"In total, I've lost my PDA data four times, waited in for the courier on four different occasions, and have had to endure numerous tedious experiences with the Sony support team. But, despite all this, Sony won't admit the CLIE TH55 is a faulty product. Have you any suggestions as to what might be wrong with my PDA, and why Sony won't admit liability?"

M Yacasan

Roger replies: I was genuinely shocked to hear this appalling tale. After all, how many components are there in a PDA that can go wrong? I immediately shot off an email to Silke Schild, the PR manager for Sony Europe and, to her credit, she wasted no time in responding with a pretty reasonable offer.

Silke Schild's suggestion: "Having reviewed the comments, I can say that we have not encountered a complaint of this nature before, and it is highly unusual for M Yacasan to have had so many difficulties with his CLIE. As a result, we will gladly offer him either a full refund or a new replacement model, whichever he would prefer."

Dell warranty compensation

Reader Peter Graves came unstuck when he tried to invoke some support from Dell in respect to his expensive four-year warranty. In fact, it was so inadequate that he had to go and get his Dell PC fixed elsewhere. This cost him money and, quite reasonably, he felt that Dell should reimburse him. Here is his story:

"I first contacted Dell technical support after noticing corruptions in my desktop icons and streaming video operation. The advisor helped me

update my graphics card drivers and BIOS on top of Windows XP SP2 that I had installed successfully a few weeks earlier. As this didn't cure the problem, and Dell thought I had a software problem, I was advised to uninstall SP2, repeat the various updates and then install SP2 again. Some hours later, my uninstall of SP2 failed – it just 'hung' for four hours. So, after following Dell's advice, I was left with a PC in an unstable state, which was lacking a number of functions, including disc copy.

"Unsurprisingly, I contacted Dell technical support again. It still thought that I had a software problem and suggested I talk (at a standard cost) to its software support staff.

"During my first communications with their staff, I was, understandably, asked to first back up my data. However, I couldn't do this on my unstable PC. As I wanted to make sure that I didn't lose any more data than was absolutely

With Sony's reputation for high-quality hardware, one PC Plus reader didn't expect to have so many problems with their PDA.



WRITE IN

Your opinions count

If you have a gripe with a company, a compliment for one, or even a suggestion for future Campaign topics, we want to hear from you. To help us help you, please include all appropriate reference/serial numbers and your full contact details.

- ✉ campaign@pcplus.co.uk
- ✉ Fax a printed letter to Campaign – 01225 732295
- ✉ Send a printed letter to: Campaign, PC Plus, Future Publishing, 30 Monmouth Street, Bath BA1 2BW



<http://forum.pcplus.co.uk>



Although Dell's technical team works hard to solve PC problems, things can go wrong, as Peter Graves found out.

necessary, I had no choice but to put the PC into the local repair shop, where they can nearly always save data. After examining the PC, and charging me £60, the shop staff told me that I definitely had a graphics card hardware failure. I then reported this to Dell technical support, who asked me to do a system restore. As my PC couldn't do this, they then asked me to run the

graphics card diagnostic that was supplied with the PC on purchase. The diagnostic immediately reported a card fault. Dell now accepted that I had a card fault and sent an engineer to replace the card, and that was all that he was contracted to do.

Inadequate compensation

"As my PC was still very unstable, I put it in to another local repair shop, notching up another swift £60 charge, and quickly got back a working system. I then had to reinstall almost all my applications. As I had spent £120 getting my PC repaired, and it had been out of action for over eight days, I sent Dell a summary of our dealings and asked them to pay just £60 of my costs, which was exactly half of what I had spent. All I got in return was an offer to extend the warranty, or goods worth about £15. I felt that this was inadequate and so I refused.

"With service like this, I wonder how I benefited from my Dell warranty." **Peter Graves**

Roger replies: Peter is quite right to wonder how he benefited from his warranty, and I'm surprised Dell technical support was unable to diagnose something as fundamental as a graphics card malfunction. I put the case to Paula Warmer at Dell, who promptly sorted out this mess.

Paula Warmer responds: "I want to confirm that our Customer Relations team have been in contact with Mr Graves and a refund for the amount he paid to the third party of £120 was sent to him. We have also apologised for any inconvenience caused to him during his communications with Dell. Mr Graves advised us that he was satisfied with the outcome."

Peter Graves concludes: "A sincere thank you to the staff at PC Plus for liaising with Dell on my behalf, and

getting them to reimburse the costs of going to two PC repair shops. This happened after my PC graphics card failed while under guarantee, but Dell technical staff failed to find the fault and made matters worse with their advice. I struggled for weeks with them to try and recover costs, but you got an excellent result in days. Your efforts are bound to help keep PC supplier standards high, as well as help out the little guy. Keep up the good work."

Dell warranties, part 2

I hesitate to return to Dell for a second time in this column, but reader Steve Watson had a particularly gruelling experience with arguably the world's most popular PC vendor, and it deserves mention. His tale is a lengthy one and so I've had to cut it down.

Back in November 2001, Steve bought a Dell Inspiron laptop. He was advised by Dell which model suited his needs and to use Windows Me and not XP. As he makes frequent overseas business trips, he paid over £300 for an 'International Next Day On-site' service package. When it was delivered, just a few of the problems that his new Inspiron had included a damaged screen, a noisy soundcard and an operating system that couldn't cope with some of his applications.

What should I expect?

Steve complained directly to the sales representative who told him he had to contact technical services. Unfortunately, his experiences with Dell technical support weren't encouraging:

"I've spoken to Indian call centres on more occasions than I care to think about, I've had repair staff on-site who have broken my machine further, left the remains behind with a third party and gone. I've spent many hours on the Dell helpline and had all the

promises and redirections I can stand. I've sent my machine to Dell who has promised to return it after five days, and still been waiting three weeks later. I've gone away twice now and left it for collection, only to return two weeks later and find it still where I left it."

Steve then complained directly to Michael Dell himself and this seemed to have helped, as he did eventually get a replacement laptop. But problems still remained, as the keyboard was partially detached, and noise problems continued with the soundcard. He then suffered extensive problems while getting these problems fixed.

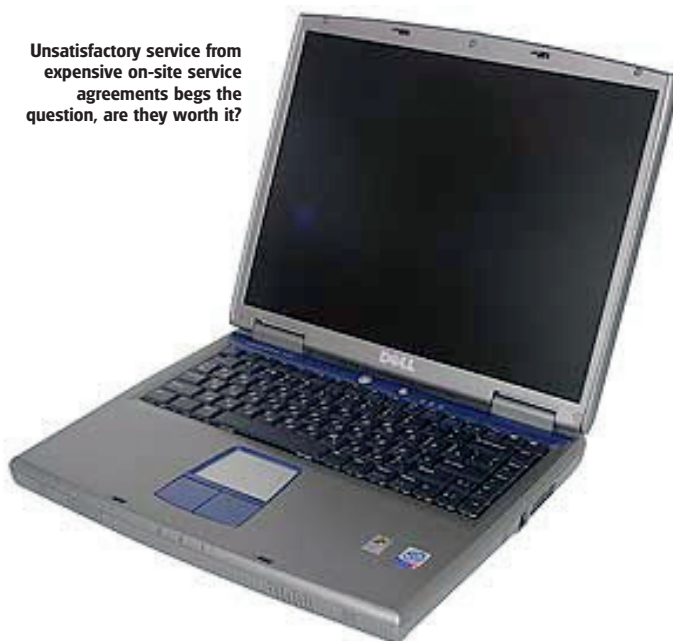
Steve has requested fair compensation for his time, his long-distance phone charges and the cost and inconvenience of still not having a well-built fully functional and reliable laptop after two years. Dell has offered him a two-year warranty extension but Steve rejected it. He also rejected their offer of £100 compensation as being "rather insulting." Steve feels he's entitled to a complete refund of, as he puts it, the extra warranty he paid for. He writes:

"Am I wrong to expect a fully functional reliable machine of high build quality from Dell? Am I wrong to expect 'International Next Day On-site' to mean just that? As they have failed to live up to this description every time, should I be entitled to a refund of the warranty cost?"

Roger replies: A long complaint like this warrants an equally long reply from Dell but, once again, I've had to shorten it a bit.

Dell answers: "Thank you for sending this customer letter to us for our feedback. We have since investigated the issue thoroughly and have brought up the points that have been raised with the most appropriate personnel within the

Unsatisfactory service from expensive on-site service agreements begs the question, are they worth it?



organisation. We would like to begin by apologising to Mr Watson for his experiences when dealing with Dell. We endeavoured to fix the issues that arose as quickly and effectively as possible, and are sorry that Mr Watson is not satisfied with the outcome. It is our aim to deliver the best possible experience to every customer, every time."

Roger adds: Dell maintains it asked Steve to help track down the noise problem but that he didn't respond. It also points out that it repaired the minor accidental damage to the laptop even though this wasn't

covered. It maintains that part of the three-month delay in fixing it was down to Steve's "refusal to release the system for the collect and repair service." It has offered to send an engineer to fix the outstanding items.

Dell continues: "We are very keen to help Mr Watson resolve any outstanding issues with his computer. In recognition of the difficulties he has experienced, we have offered him what we believe to be a generous offer. We have also offered to take back the computer and repair the keyboard and screen case at a convenient time for him.

We work hard to ensure every customer gets a positive experience. While we admit we don't always get it right, it is a priority for Dell to focus on delivering an industry-leading customer experience."

Roger concludes: This is not what I'd call a particularly satisfactory outcome for the customer. From what I know of the case, I think Steve has had poor value from his on-site warranty. Sadly, it's stories like these that serve to reinforce my growing doubts as to the value of expensive extended on-site service agreements on laptops. **PCP**

GOOD GUYS OF THE MONTH

Evesham, dabs.com and Tekheads

A bumper three nominations this month

Evesham

It's been a while, but it's nice to dispatch some bouquets in the direction of one of Britain's largest home-grown PC vendors, Evesham Technology. It seems Keith Watts was eventually bowled over by Evesham's swift service when he had some problems with a dud monitor. He writes:

"I must put fingers to keyboard to compliment Evesham on prompt and efficient service. I had a problem with my Philips monitor under warranty and, after initial contact with Evesham, I contacted Philips as I had been told to do. Philips fobbed me off for a fortnight and finally told me that I would not receive a replacement within two weeks.

"Getting nowhere, I contacted Evesham again. After concluding that Evesham was also having difficulties with Philips, I suggested that it may consider sending me a Viewsonic, with me paying any difference. That was at about 11am. At 2pm the following day, an Amtrak van pulled up with my new monitor. Great service indeed. You deserve a commendation!"

Roger replies: Don't forget, if you do have problems with defective kit, your first port of call for redress is always the vendor, never the manufacturer. You can enforce a contract with a vendor, but you can't enforce a warranty with the manufacturer.

dabs.com

Our second Good Guy nomination this month comes from reader John Burt, who's nominated dabs.com. It's had its fair share of brickbats in this column, but not this month. John explains:

"I began my search for a Belkin on Ebay, thinking I might get a bargain, and I was amazed to discover that people in the auctions were bidding more for new, and used, Belkins than the price at which they were available new from reputable suppliers.

"So I looked further and discovered the 3Com available at dabs.com, together with a bundled USB adaptor. Even better, they had a 'used' one available for £10 less than the advertised price. Reading the description, it seemed likely that a cable customer had accidentally ordered an ADSL model. I bought it.

"I made the purchase early in the evening of 11 January. I thought that I'd opted for normal delivery, which was £5. At about 1pm on 12 January, Parcellforce turned up with the package in rather less than 24 hours. The modem had clearly not been used or unpacked previously, and the invoice actually said 'new'. The postage cost was only 89p more than I thought I had chosen, so I had no gripes there either.

"I don't know what happened. Perhaps there was a warehouse selection error, or maybe they were unable to find the 'used' machine. Whatever the reason, this service was better than I've ever experienced."



In past columns, www.dabs.com has come in for the odd knock. This month, we're delighted to hear from one extremely satisfied customer.

Roger replies: I have to concur with John, dabs.com's order fulfilment can be slicker than a very slick thing. Its integration with Parcellforce is, remarkably, pretty tight and certainly more reliable than the dealings I've had with other companies. At this rate, you'll be hearing the front door bell shortly after you click 'Buy' on the website!

Tekheads

I reckon that you PC Plus readers are revelling in the joys of spring this month, and just overflowing with the milk of human kindness. Why do I say this? Because, this month, we have not two, but an incredible three Good Guy nominations to enjoy.

Anthony Carter knows a thing or two about the computer business, working as he does as a tech support analyst for a high-end computer software company. And, refreshingly, he has some very nice things to say about online retailer Tekheads. As he tells us:

"I've just dealt with Tekheads and ordered a number of items. During this process, I've requested information regarding due dates and changed my order twice. I was a little concerned that the only means of communication for this was by email, and its low prices for numerous items did lead me to initially suspect that there may be a lack of service. However, my suspicions were unfounded. After I had corresponded by email on all three occasions during the transaction, not only were the replies positive, but they also usually arrived in under an hour.

"The system that Tekheads employs also allows the tracking of those support emails and their responses, which is something I found very useful. The website also shows what stage each order is at, and what the order is waiting for before it's posted. On one occasion, my order was ready at 4pm on the afternoon it was shipped and I received it at 11am the next day. And, into the bargain, the delivery price was also very reasonable. In all, I was really impressed by Tekheads' professionalism, efficiency and politeness."



Your home office

PCs, broadband and virtual networks are helping more people work from home, but **Richard Hill** discovers that you can enjoy the change more if you know what to expect



RICHARD HILL

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Richard is former editor of *Mobile Computer User* and now works from home as a freelance technology journalist

The thought strikes you for the third time this week as you're trapped in the Friday night tailback: is this really necessary? Now that you've got a powerful PC at home with a 1MB broadband connection, why are you still commuting when you could just as easily do the work from home? Looking around at the forlorn faces sitting in the traffic jam that mirror your own: you're not alone.

The Internet and other digital technologies are changing our working lives in the same way that

they're transforming activities like shopping. It's no longer essential for a team of workers to be in the same physical space when they can collaborate by email, instant messaging and video-conferencing. A PC that was once fixed to your office desk can now deliver the performance you need in a laptop you use anywhere. And a company IT infrastructure that was once kept secure by remaining within a single building can now accommodate remote workers through a virtual private network (VPN).

The impact of technology has led to a huge growth in teleworking: working from home using



Illustration: Daniel Mackie

a PC and a telephone as your main tools. Government labour force figures (Source: Department of Trade and Industry, 2005) show that over 2.2 million people do some degree of teleworking, even if it's only one day a week. In 1993, only 130,000 people followed the same practice. The figures also indicate that three out of five people telework while remaining on staff at their company, with the rest working for themselves. Managers account for a significant percentage of the employee total, which suggests teleworking is regarded as a perk at many firms. But tasks such as software programming and

writing, which demand concentration, are also ideal for working from home. Even taking a day a week out to catch up on emails and reduce your to-do list can make any worker more productive.

The trend means that negotiating with your boss for increased flexibility is possible at a growing number of firms and, in many cases, the law is on your side. Parents with children who are under six years old, or have a disabled child under 18, can compel their employer to seriously consider a request for more flexible working, which can include teleworking. There's also the constant lure of striking out on your own and

building your own business. Your home can provide a low-cost base as you get started.

Making the decision

Before you storm into your manager's office with your list of demands – or a scribbled resignation letter – it's worth considering the impact that teleworking or establishing a home-based business can have on the rest of your life. You can find yourself feeling isolated as you lose contact with colleagues, while a change in working patterns can profoundly affect your income through tax and other regulations.



Telework checklist

Are you ready to work from home?

>> Does your job revolve largely around tasks you can complete on your own? This makes you a good candidate for teleworking.

>> Is your employer convinced of the benefits of teleworking? Is it aware of the costs involved and its legal requirements? Don't be afraid to make your boss aware of the issues.

>> Are there any legal barriers stopping you from working from home? Make sure you're not breaking your mortgage or tenancy agreement.

>> Do you have enough space in your home to accommodate a set-up that will allow you to work adequately, and which meets safety regulations?

>> Is your family onboard? Have you negotiated the ways in which your work duties will blend with your home responsibilities?

>> Are you prepared for the relative isolation of teleworking? Consider alternative ways of organising social and business networking.

>> Can you solve basic PC problems? Work shouldn't grind to a halt because technical support is miles away.

>> Is your employer aware of health and safety requirements? If you're self-employed, you still have to follow guidelines, such as making sure your chair and desk height are correct.

Family. Another perk of the home-working job, or a distraction that will stop you getting work done?



As employment thinktank, the Work Foundation, puts it in a report on the issues: "Homeworking is not for wimps." That's no idle boast. To make homeworking work for you, discipline is vital.

The effect that working from home will have on your personal life is perhaps the most crucial factor to consider before taking the plunge. It's easy to be seduced by the promise of less commuting, but you should assess your work needs and your home's ability to meet them as objectively as possible. If, for example, you have a young family, you need to work out whether you can realistically expect to work undisturbed.

It's worth talking to your partner and other family members before getting anywhere near making a decision on teleworking. Discuss issues such as whether your workspace would be out of bounds to others during agreed hours, and even who would be responsible for keeping the area clean. Be as flexible as you can. The last thing you want is a situation where your children are afraid to make a sound because you're working. Be prepared, for example, to plan your day so you can take time out when the kids get home from school, then put in a couple more hours once they're settled.

You can use technology to ease possible tensions. You might create a separate work user account on your PC, so that other family members can use it without fear of ruining your work, or get a second phone line installed. That way, you

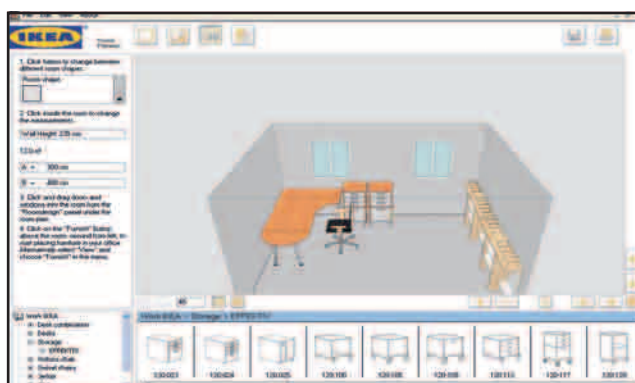
wouldn't have to deal with personal calls, and others could use the phone without you worrying that a client is trying to reach you.

The ideal home office workspace is a room set aside for the purpose. Some people use a garage or shed, or even invest in a loft conversion or purpose-made outbuilding. A separate area makes it easier to segregate your work and home responsibilities. Finishing work at the end of the day is just a matter of locking the room door behind you and stepping into the lounge. But the system can't work if other family members don't accept that it's not appropriate for them to encroach on your workspace.

Legal restrictions

The choice of what space to use is complicated by red tape. If you allocate a room for exclusive business use, your local authority is entitled to charge a business rate on that part of the house rather than council tax – even if you are still a company employee. You may also be liable for capital gains tax on that room if you later sell your home, and you could also fall foul of insurance, mortgage or tenancy contracts, which often stipulate that the property is only for residential use. Whether you remain employed or work for yourself, it's your responsibility to check these possibilities out. Remember, it's easy for your employer to suggest you stay quiet about teleworking: it's not liable. The simplest solution is to use the room for both business and home purposes, negotiating with your family to decide the most appropriate division of roles.

You also need to plan how to use the space available to you. Don't delude yourself that half the kitchen table will be adequate when you have a PC, keyboard, printer and research notes to accommodate. Giving yourself enough space to work isn't just a common-sense measure, it's a legal requirement. If you're self-employed, your work area must adhere to health and safety regulations. For example, cables should be kept away from areas people walk through and your chair should be adjustable. As you're using a PC and associated devices like a printer, it's also



The IKEA Planner makes it easy to experiment before finding it's too big for your home office.

What every teleworker needs

Technology essentials

PC

>> Someone needs to pay for the PC you're going to use, whether you're going self-employed or simply working from home. If you're an employee, consider whether you need desktop machines at home and in the office, or whether you should have a laptop you could use in either location. Assess your realistic technology needs so you don't pay for what you won't use.

Broadband

>> Don't even think of running a home-based business through a dial-up connection. Broadband is now just as affordable. If you're choosing your own service provider, look carefully at bandwidth limitations. Many low-cost accounts cap the amount of data you can upload and download each month. If you need to send large files to your employer, consider an SDSL link rather than the usual ADSL, so you can upload files as fast as you download them. A self-install broadband account enables you to choose your own equipment and establish a home network more easily. Low-cost accounts include a USB modem that's less suited to frequent use.

Server tools

>> Your company should be able to provide you with access to its intranet tools, such as company-wide address books or web-based forms. A virtual private network connection enables you to log onto shared folders and servers as if you were in the office.

Communications

>> Telephone and email access are must-haves. Consider using a second phone line to separate business and personal calls – as well as their associated costs, which helps with detailing expenses. Employers may be able to save costs by using Internet-based phone services that send your calls through your broadband connection. If you're working for a company, it's the firm's responsibility to set up remote access so you can continue to use your company email address. If you're self-employed, get a business webspace account with your own domain name. Even if you don't build your own website, you can offer a distinct email address that makes a better impression than using your ISP or Hotmail. You should also consider whether video-conferencing or instant messaging will help productivity or offer an unnecessary distraction.



important to ensure all electrical connections are safe. If you remain an employee, your company is responsible for ensuring that you follow the same guidelines. It must either arrange visits to check your set-up or train you to do risk assessment.

Beyond the hard-nosed practical issues of working from home lie many more personal consequences. Moving from the cut and thrust of office life to the relative quiet of working on a PC at home can make you feel isolated – not just socially, but politically and creatively. You need to understand your company culture enough to assess whether being out of sight will mean you're out of mind when it comes to promotion – or whether the personal benefits are more important.

You can alleviate the impact of your new work pattern by devising new ways of networking.

Video-conferencing equipment that enables you to join company meetings is an obvious example, but you can also establish new social networks. If your move into homeworking is part of a broader company initiative, for example, you could encourage colleagues who live nearby to meet periodically and share issues and ideas. Telecottage schemes establish satellite buildings in a suburb, where two or more people go to rather than commute. Telecottages provide social interaction while offering many of the advantages of working from home.

Convince your boss

If you're lucky, your company already has a progressive flexible work policy that gives you a good chance of realising your teleworking

ambition. If that isn't the case, it's down to you to persuade your managers.

First, be realistic. Some types of job are simply not suited to teleworking. Your role can be adjusted more easily if you are predominantly involved with managing or creating information and enjoy a reasonable degree of autonomy. Ideally, you are supervised through meeting set targets rather than face-to-face contact. If you're unsure whether or not your job meets the ideal criteria, maintain a work diary that breaks down the time you devote to different tasks, such as making phone calls and attending meetings, then divide the list into jobs that you can do alone and those you do in a team or require supervision. The more time you spend on autonomous tasks, the better your case is for teleworking.

Realism also involves taking a long, hard look in the mirror. If your employer doesn't trust you or doubts your commitment, your teleworking proposal may be a non-starter. Assess your self-discipline and your ability to work unsupervised. It's also worth considering your manager's

"Moving from the cut and thrust of office life to the relative quiet of working at home can make you feel isolated – not just socially, but politically and creatively."



PC security

>> Working from home may mean that your PC holds information your company regards as sensitive. Expect to follow security measures, such as account passwords or encrypted disk images. Many companies will insist that the PC is used for business purposes only, and may need you to read and sign an IT policy document to show that you understand its security measures.

A virtual private network or VPN (see this month's feature on Internet security, starting on page 82, for an explanation) enables your employer to give you access to its servers as if you were in the office. A cheaper but less secure option is for the company to provide services over its website, giving you an account name and password with which to log in.



Web cameras offer an easy way for your boss to check you're not slacking off. But they may be of use to you too.

abilities. An insecure manager who lacks the confidence to deal with remote workers could scupper your argument.

Money talks. The best way to persuade your company of the wisdom of encouraging telework is to write a costs and benefits plan that sets out what the likely impact would be. If you don't know how much your firm spends on office rental or heating, you can still list all the areas where it could make savings. Show that you've considered both sides of the argument by acknowledging the costs to the company of teleworking, such as the Internet connection and extra insurance cover that takes into account the new, non-domestic role

of your home. Suggest how IT support could be managed between the office-based support team and home workers.

You should make an attempt also to assess gains, such as productivity and customer relations. Work out how much more you could get done if you enjoyed the peace of home against the bustle of the office. Propose customer benefits such as the ability to extend the hours during which the company's services are available. If you provide customer support, for example, you can point out that working from home would enable staff to offer support during evenings, extending the company's opening hours. Your proposal

should also include details of what days or hours you are suggesting for teleworking.

Needless to say, the first person you should discuss your teleworking proposal with is your immediate manager. You are far more likely to convince senior managers if your boss is onboard and convinced of the benefits.

A typical employment contract includes details of the employee's workplace, but that's far from the only paragraph that may need rewriting if your employer agrees to teleworking. Expect to renegotiate working hours or core hours during which you must be available, as well as what your duties are. You should get a written agreement that says what happens if you decide you want to stop teleworking and return full-time to the office.

More informally, you will need to agree with your manager how monitoring will work and how feedback should be given. It might be sensible to establish a system under which your ability to hit deadlines and deliver work of the required quality is assessed, with less attention paid to what hours you actually work.

Between you, you must decide who's responsible for providing equipment. It's the company's job to supply a PC, but some employers allow workers to use their own desks and chairs if they prefer. You may also require training. Both your employer and you can save effort and money if you are more able to troubleshoot your own PC set-up, and it's also helpful to get tips on managing your time.

Go it alone

If you're attracted to the idea of teleworking and you believe you can adjust your home life to fit its demands, you may be tempted to break away from your employer completely and set up your own business. It's critical not to be seduced by the romance of such a venture. Make sure you have a business idea that can actually work as a

adding value for the extra fee. While working from home can remove the cost of renting your own office space, always remember that your customers don't care about whether you're teleworking – they're just interested in getting a good service or product.

Before you get too immersed in the idea of using your home, consider whether you will regularly need to bring clients to your workplace; and whether nagging your family to keep everything clean and tidy might just be more trouble than the savings associated with homeworking are worth.

The idea of the virtual enterprise, where small businesses collaborate over the Internet to share expertise and even bid for contracts together, is a growing trend. Yorkshire Forward, the regional development agency for the Yorkshire and Humber area (www.yorkshire-forward.com), is coordinating six such social networks over the next few years in what it claims is the UK's largest virtual enterprise project to date. Each virtual enterprise can bid for large contracts no single member could hope to win, then the relevant businesses use web-based tools to collaborate over the duration of the contract.

The taxing issues

Your employment status affects the compensation to which you're entitled when you work from home. If you're self-employed, the situation is fairly clear-cut, with the Inland Revenue happy to accept tax relief claims for what it describes as allowable expenses (for instance, costs that a business may incur). These include lighting, heating and capital such as PCs. The Inland Revenue website (www.inland-revenue.gov.uk) offers documents that explain what is a legitimate expense and what isn't.

Because you're using your home as both a business and a personal area, the Inland Revenue expects you to calculate what proportion of household bills, such as electricity, was actually used for business, and to claim only for that part of the bill.

If you remain an employee, you can claim expenses from your company, though the list of what's permissible is open to negotiation. Some employees accept the burden of

paying for extra electricity use in return for the flexibility of teleworking. A separate phone line can make communication expense claims much simpler, as well as protecting your privacy by removing the need to present your personal phone bill to your employer each month.

There's a grey area in employment law that you should be wary of if you go freelance but continue to work for your old company as a contractor. The Inland Revenue often classes people who work wholly or largely for one client as employees, with your client maintaining responsibility for paying you through its PAYE system. The decision can dramatically affect your finances, as it changes the expense claims you're entitled to make.

As with many elements of the decision to work from home, claiming expenses is ultimately a matter of consensus. Both your employer and you must trust each other to respect each other's interests and rights. **PCP**

Further reading



Time To Go Home?

www.theworkfoundation.com/pdf/5110000056.pdf

A PDF report by the Work Foundation, which goes into the pros and cons of teleworking from both the employee's and the employer's perspectives.



Working Anywhere

www.dti.gov.uk/bestpractice/assets/wanywhere.pdf

A PDF booklet from the Department of Trade and Industry looking at the practical decisions involved in implementing a teleworking strategy.



Homeworking Safety

www.hse.gov.uk/pubns/indg226.pdf

Guidelines from the Health and Safety Executive, offered as a PDF, which sets out the steps you should take to ensure your home office is a risk-free environment.



More PC Plus features

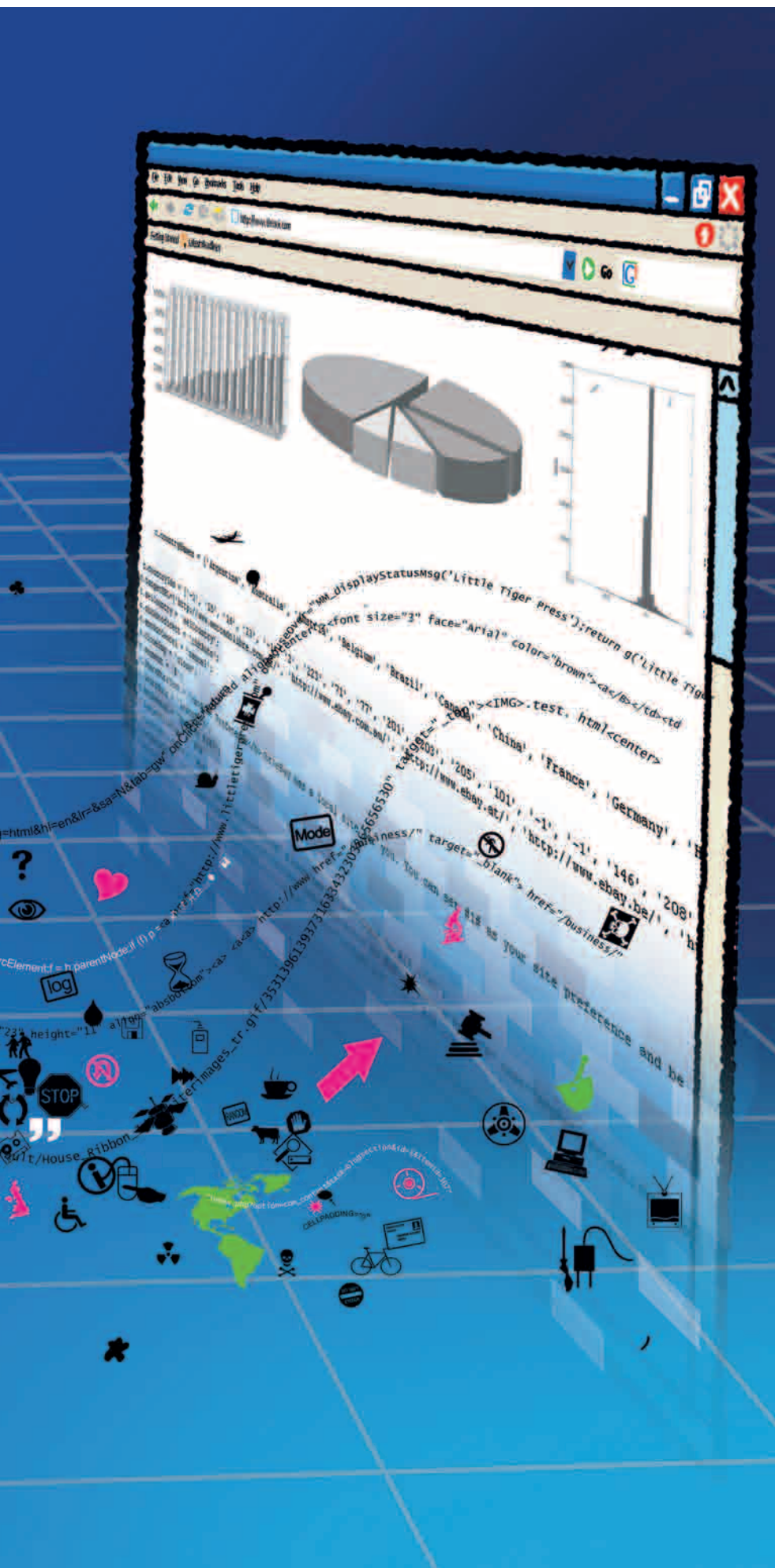
Over the coming months, we'll be running further articles on the technology you should be using, workflow and time management, ergonomics, ongoing legislation and other specific issues relating to working from home.

"Money talks. The best way to persuade your company to try teleworking is to write a costs and benefits plan ... "

commercial venture and as a home-based project. Do your research and form as complete a picture as possible of what you're getting into.

A business plan is a great help in sorting reality from dreams. You can expect to have to write such a document if you want to get business funding, but it's a valuable exercise even if you expect your start-up costs to be low.

Your business plan essentially sets out the aims and strategies of your project. It shows a potential financier that you have considered options, such as how you will find customers. You should also break down capital costs – one-off equipment purchases such as your PC – and ongoing costs, such as your monthly broadband bill. Setting out your expenses enables you to properly assess how much you need to charge. Use your experience to compare your charges against those of potential rivals. If you are charging more, work out how you can trim costs or how you can convince customers that you are



Chris Schmidt
chris@track5.co.uk

A web designer by trade, Chris writes regularly for various PC and digital camera magazines



Jono Bacon
jono.bacon@futurenet.co.uk

Linux evangelist and web developer, Jono knows his CMS from his elbow - and he's a long-time blogger to boot



PART ONE THE BASICS

Creating the foundations

PART TWO BLOGGING MADE EASY

Online journal

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Forums for feedback

PART FOUR TOTAL CONTENT MANAGEMENT

The backend

PART FIVE THE WIKI WIDE WEB

Your users take control

PART SIX WINDOW SHOPPING

Making money

Now's the time to build whatever you like around freely available software. From simple blogs to full Content Management Systems (CMS) with integrated forums, wikis and even online stores, there's almost nothing you can't do online, as long as you're prepared to take the time to put it all together.

There's no such thing as a personal web page any more. These days, you can't be taken seriously online without a whole website backing you up, juggling themes, pages, CSS code and more. It's never been harder to wrap your head around the choices available, but equally, it's never been easier to take advantage of them. Learn one system, build one or two sample templates, and the rest will open up.

We're not going to be looking in great detail at how to actually install each piece of software, nor are we going to study the inner workings of a mere handful of applications. Instead, reading this feature will give you the understanding you need to find the features and services that work for you, whatever your game. With most of the big names being available as open source, and the Internet itself offering live trials of almost all of them at the touch of a button, the only limit to your creativity is your knowledge of what's available. We'll guide you through the main pillars of a modern website but, after that, the choices are all down to you.





PART ONE THE BASICS

From domain registration to sorting out your hosting package, the decisions you make here can make or break the best-laid plans

The Internet has taken great leaps since its early text-only roots in academia. Technologies have emerged and developed to enable complex data-driven sites with seemingly authoritative content, such as the Internet Movie Database (www.imdb.com), full-blown multimedia experiences through the likes of QuickTime, Real and Macromedia Flash, through to hybrid applications made possible through Java.

Getting your own site up and running isn't a difficult task, as you'll soon discover, but there are many decisions to be made. Probably the most important decision regards the content of your site. There's little point starting an online auction site with the likes of eBay dominating the market, and it's worth taking time to think if the world really will be interested in the adventures of your growing kitten, Tiddles.

Promoting your business, publicising your Morris dancing activities or creating an enthusiast's website for a little known interest may be a more viable option, but take the time to research your market and potential competition. There's no point spending precious time and money developing a site that offers nothing new in terms of content when compared with existing and established sites.

Once you've decided on your master plan for online domination, you'll need to consider the content. Sit down with a pen and notepad and plot the key aspects your site should cover and you'll start to see how your site structure and possible navigation begin to take shape. You'll also begin to realise how certain areas could be expanded to include more dynamic features, and how your site can offer something unique, keep your audience's interest and encourage them to bookmark your pages to return in future.



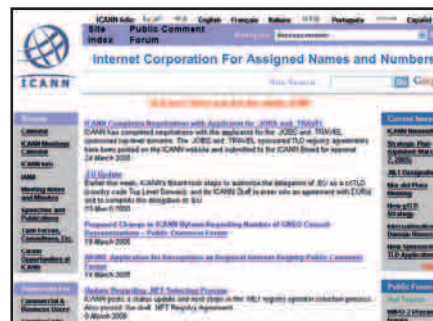
Nominet is the principle UK agency that you'll be dealing with, but never directly.

Domain names

Getting hold of a memorable domain name is an important first step to creating your site. This should be something as short, relevant and memorable as possible. You'll also need to consider the domain extension your site address will be known by and whether you need to register related or country-specific domains.

The Top Level Domain names (TLD) were originally developed to cover commercial content (.com), Internet-related network ventures (.net) and not-for-profit organisational bodies (.org). These remain the primary global extensions, though ICANN (www.icann.org), who govern domain names and IP address numbers, occasionally introduce new extensions such as .aero, .biz, .info and .museum to cater for the growing number of domains. This site may be worth checking out if you're getting frustrated finding something unique to brand your site by.

Second Level Domain names (SLD) relate to country-specific addresses and follow the same general categories as TLDs with .co.uk providing commercial UK addresses and .org.uk for organisations. Nominet (www.nominet.net) is



Meanwhile, ICANN calls the shots for much of the internet as a whole (for better or worse).

the place to go for the management of UK-specific domains, but you won't be able to register domains directly with it. It does, however, provide a substantial list of reputable companies from whom you can do so, and you're strongly advised to check the credibility of a potential domain registrar via Nominet before you hand over your credit card details. Less respectable companies may not list you as the registered owner, making it difficult, if not impossible, to transfer your domain management or associated hosting in future.

To see if a particular domain is available, you'll need to start off with a WHOIS search through the likes of Network Solutions (www.networksolutions.com) for a TLD or a Nominet accredited agent which, for an SLD, will tell you the availability of a domain or the status of one already registered.

You never actually 'own' a domain. Instead, you rent it for a certain amount of time, which can be anywhere between one and a hundred years. Be sure to register your details accurately and make any changes to email addresses should you change this in future, to ensure that you receive renewal notification and have the relevant permissions to re-register your domain when the time comes.

The host with the most

As part of the domain registration process, you'll undoubtedly be offered various hosting packages. This forms the next important decision to make when creating your site, as a domain on its own is useless (other than for email) without a host on which to upload your site and make it available 24/7 online.

Hosting packages vary and it's worth shopping around for a deal that suits your requirements and wallet. There are numerous freebie packages around (as a quick Google search will reveal), but these are generally to be avoided unless you don't expect much traffic or flexibility with your site.



The best part about web development is that you're never more than a click away from assistance.

>> Installing your software

The bad news? It can be complicated. The good news? Do it for one program and you won't have much trouble with the rest

Most web software, at least in the categories covered here, is PHP-based, using a MySQL database to hold any necessary data. If you plan to self-host your site, you'll need to handle all the intricacies of this yourself – not a good idea if you're unsure of your skills. However, in most cases, you'll get everything you need as part of your hosting package. PHP files are self-contained web programs, with the advantage that the source code isn't visible in the same way as HTML web pages. If anyone tries to view the source, they only see the results of the program's work. To run a PHP program, you simply upload it to your server and enter the URL into your web browser.

Every program you try will come with in-depth installation instructions. Usually, these involve editing a configuration text file to enter your database information, including username and password, and then running an installation script to set up the necessary database tables. The only tricky part is that, occasionally, you'll have to handle this step yourself. If you have access to an application like phpMyAdmin, this is a piece of cake. All you have to do is open your MySQL database in it, click on the 'SQL' tab and upload the SQL file from your web application's directory. If not, things get trickier. Ask your host for help if you need to connect via a terminal, or have data dropped straight into the database.

Another alternative is the Fantastico approach. This is often provided with virtual hosting packages and offers a one-click method of deploying and upgrading a wide range of web applications in the directory of your choice. Some companies even offer a direct installation service for their software, albeit for a fee, though you'll almost certainly be up and running faster if you just grit your teeth and hit the installation documents. If nothing else, you'll end up with a basic install and still have to hit the books to theme your pages and configure everything to your liking. There's nothing worse than having an instantly recognisable template to represent your online individuality.

Make a META

You'll find more direct advice on Search Engine Marketing (SEO) later in this feature, but bear in mind that your site will benefit from relevant and current content. You'll also be giving your site a substantial lead if you include META tags that cover keywords and descriptions. These go in the <head> part of your page, and give search engine spiders a greater understanding of your site's content and purpose. A summarised description of 30 words, and no more than 50 related keywords, is all that's required to give your site a high ranking on searches run by visitors through the likes of Google or Yahoo! ■

"A typical site can be as small as a few hundred kilobytes, but this can quickly rise to a few hundred megabytes"

Paying even a modest amount with a reputable hosting company will enable your site to support more advanced content, but take care to choose a host that supports the kind of technologies you're most familiar with.

If you're a PHP author, a Linux box will be your preferred platform, while ASP coders will gravitate towards Windows servers. You'll also benefit from some kind of online interface that enables you to configure certain aspects of your servers functionality, such as the creation and management of databases, email configuration and any number of server-related features.

A typical site can be as small as a few hundred kilobytes, but this can quickly rise to a few hundred megabytes if you intend to include hefty downloadable content. Keep this in mind when deciding on the amount of server space available, as too much is never enough.

You'll also need to consider how popular you think your site will be. An affordable shared hosting package may provide all the tools and features you require, but will you run into additional costs should the number of visitors exceed a predefined limit? Generally, such a limit is above that necessary for the average site, but there are plenty of examples that experience unanticipated surges in visitors that exceed the amount of data transfer allocated.

Finally, consider the number of email accounts you can create, the amount of connectivity that's guaranteed (and what happens should this fall below standards) and the level of support your prospective host provides, and you should have enough confidence to make a

decision that best suits the purposes of your site.

There are many benefits to arranging the domain registration and hosting through the same company. Managing the DNS settings that associate the domain with the hosting server is simplified

and you're much more likely to receive more comprehensive telephone or email support. But with the right planning, and by choosing reputable agents, there shouldn't be too much difficulty in getting the basics set up.

After that, it's down to you to create your site and upload it to your server. HTML isn't rocket science, and there's no excuse for even the least technically-minded user not to master the mark-up language, but check out sites such as www.htmlgoodies.com and www.w3schools.com if you need a quick primer. With applications such as Dreamweaver around to help out, even the most code-shy author should be able to create an impressive, functional online presence that will find itself rising up the Google rankings. ➔

>> Hosting

The entire process of creating your own website should be relatively hassle-free. The most important step is to consider the content of your site, which should be fresh and original to rise above competing sites. You'll then need to arrange the registration of a domain name and set up hosting space to which you can associate your URL and make your content available online.

Hosting packages vary and you'll need to shop around for the most suitable options to your requirements, deciding whether a simple shared package or a more expensive dedicated server is necessary. Consider also a reseller package if you plan on creating multiple sites. This way, you won't run into excessive costs when associating multiple domain names to your server.



Anyone who's anyone has a web portal. Of course, the BBC focuses heavily on news.



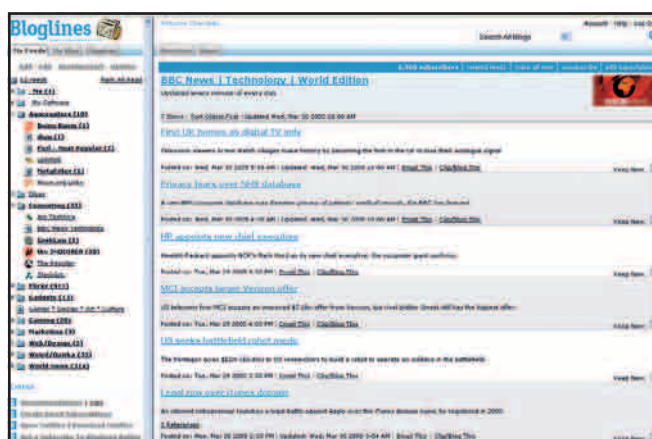
PART TWO BLOGGING MADE EASY

Ideal if you love to write, for yourself or for work, your own blog is by far the easiest way to move beyond static pages

In a world swamped with magazines, publications, websites and other media, blogging has turned the tables on how you can publish content. The basic concept behind blogging is that you provide an online diary/journal in which you can write about whatever and whoever interests you, and write it when you want. There are no word counts, deadlines, angry editors and, as you would expect, no pay. Blogging is all about self-publication on your time.

Although online diaries are nothing new, the recent cultural explosion of blogging has turned everyday bloggers into journalists who report on their experiences to often large groups of dedicated readers.

The blogging concept was exploited at first by open source developers who could share their work and views with fans of the software they were working on. This gave readers of the blog a personal and behind the scenes view of what goes into the software before it's released. This idea has since been taken up by corporations such as Microsoft and Sun, who have corporate blogs that they encourage their employees to use. One of the most intriguing uses of technology behind



Blogger reads in RSS feeds from all the sites you want to visit, displaying them in an easily digested list.

blogging has been RSS-to-syndicate content. This XML-based technology can be used to update a subscription feed when the blog is updated with new content. This feed is located at the same URL on the blog at all times, and people can subscribe to the feed with an RSS reader. This means that when you post a blog update, the new update will be readable by users subscribed to the feed. The

RSS reader often works in a similar way to email. When a new blog entry is added, it will appear in the reader as a new message. There are a huge number of RSS readers available for all operating systems, and also on the web (such as Bloglines at www.bloglines.com). In addition to dedicated RSS readers, RSS support is built into Firefox and Thunderbird. Not only bloggers use

>> Picking your blogging tool

Both free and commercial, but all powerful enough to run your site with aplomb



>> Wordpress

Wordpress (www.wordpress.org) has proved to be a popular blogging tool, with features such as instant republishing, comment spam protection, blogrolls, password protected posts, simple upgrades and exceptionally strong plug-in support. Wordpress is very simple to install and use, as it uses PHP and MySQL. If you're looking for a simple, expansive and open source blogging tool, Wordpress is a good choice.



>> Movable Type

Movable Type (www.movabletype.org) is a flexible commercial blogging tool with a variety of pricing options (including free). Movable Type is a template-based blog with support for comments, trackbacks and syndication, and it's enclosed within a simple to use and sleek-looking interface. Movable Type also supports a number of third party plug-ins that extend and enhance the system in a variety of different ways.



Blogging can be hazardous to your job, as this former Waterstones employee found out to his cost.

RSS though – news sites such as the BBC have RSS that can keep you updated on the latest events without you needing to go to the website over and over again.

Rolling your own

If you're interested in getting involved in blogging, there are a number of tools and web applications that can help you get started. Possibly the first and easiest place to look is Blogger (www.blogger.com). The Blogger website provides web space and online blogging software to get you going straight away. By registering on the site, you can immediately begin creating your blog and post to it. In addition to this, a number of blogging clients that use the Blogger API can be used to post entries to your blog. Try clients such as BloGTK (<http://blogtk.sourceforge.net>) for Linux, BlogBuddy (<http://blogbuddy.sourceforge.net>) for Windows, and Juice (<http://juice.sourceforge.net>) for Mac OS X.

If you would prefer to use your own hosting and run your own blog, there are a variety of blogging web applications that you can install easily. One of the most popular of these is called

WordPress (www.wordpress.org). WordPress includes a simple and intuitive interface that can be used to add blog entries and display them to your readers. WordPress, like most other blogging tools, also supports RSS feeds out-of-the-box. Another popular tool is bBlog (www.bblog.com); a PHP-based blogging tool that is built around the PHP Smarty templating system, making it easy to modify how the system works. Each of these blogging tools is free, but there are also commercial options available, such as as MovableType (www.sixapart.com/movabletype/), which offer a commercial and non-commercial licensing structure.

When you've set up your blogging software, the final step is to write as much or as little as you want. Some people simply post to their blogs to update their readers on what their views are, or to share which TV programs they've been watching. More expansive bloggers can be seen to blog about virtually everything. In addition to writing about all kinds of different subjects, these bloggers often take photos of even the most inane things and post the image to their blogs (see www.richardcobbett.co.uk for examples). This is part of the blog culture; you write when you want to, and not when you have to.

One final piece of software that's particularly useful is PlanetPlanet (www.planetplanet.org). This simple little web application enables you to add a number of RSS feeds and combine them into a list of related feeds. This has been of particular interest in providing a single site that collects together the blogs of those related to specific projects. A good example of this is Planet GNOME (<http://planet.gnome.org>).

The dangers of blogging

Although blogging can prove to be a liberating and exciting concept, it does carry alongside it a few warnings, particularly if you work for a large organisation. The general rule of thumb is that you should always consider who may be reading your blog before you post.

There have been a number of high profile cases in which someone has posted something on their blog and got fired for it. One of the most publicised was Mark Jens, who shared his experiences starting work at Google. Less than a month after starting, he posted something Google considered inappropriate and he was fired. Jens was certainly not the first and won't be the last, so be careful when you blog!



>> Expression Engine

Expression Engine (www.pmachine.com) is a commercial publication system that not only provides a solid weblog tool, but can also be used for a variety of other types of personal publishing. With support for data modelling, web services, data-caching, nested categories, member grouping and more, Expression Engine is a powerful (if somewhat pricey) system capable of handling any of your blogging needs.





PART THREE BUILDING A COMMUNITY

Adding a forum to your site enables regular users to air their views and respond to each other, but you'll need to monitor the content

The inclusion of a forum, bulletin board or discussion group within a website can transform a site into a true community. Regardless of how dynamic your main site content is, a regular site will simply serve information and force the user into the position of passive observer, but with a forum in place, you can enable your visitors to discuss, argue or debate points you may provide through your site, as well as raise their own issues.

If you have the skills, time and inclination, you can create your own forum pages from scratch. Although this enables you to create the most suitable discussion group, you'll soon find you have little time to monitor the discussions.

Alternatively, there's a wealth of forum applications waiting to be downloaded and installed on your site with many free open source options: phpBB (www.phpbb.com), YaBB (www.yabbforum.com) and mvnForum (www.mvnforum.com). A search through SourceForge.net will reveal alternatives that may better suit your host server's requirements.

By their very nature, forums will require some kind of database provision on the server, as well as support for a dynamic scripting language, so you'll need to choose a package that suits the capabilities of your particular server. Even if you're not familiar with creating or authoring such elements, you shouldn't worry about technicalities, as the initial installation is straightforward. The creation of a database can

normally be carried out through your web host interface or the likes of phpMyAdmin before transferring a full directory to your server. You can then access a predefined page from where you can handle the configuration options using a browser-based interface.

You'll have some control over the appearance of your forum pages, either through a central style sheet or, if you're more confident of your design abilities, by creating or applying skins. The key forum categories you decide on should mirror the subjects your bulletin board will address, but it's often worth including some kind of suggestion box in there somewhere to enable regular users of your site to make suggestions as to how your site may be developed in future.

As with Wikis, the act of allowing users to add content opens things up to abuse as well as legitimate discussion, so constant monitoring is necessary. As many forum applications enable you to define excluded words, you can protect users from certain words or phrases that may cause offence. And, as the forum administrator, you'll also have the power to remove and ban certain users should they take points off topic and threaten to jeopardise the validity of the general discussion taking place.

By putting together a forum structure that adequately addresses the interests and concerns of your visitors, and by ensuring content is current and relevant, you'll soon find your bulletin board begins to take on a life of its own. ➔



Many forum applications enable you to change their appearance either through Cascading Style Sheets or via the application of downloadable skins.

>> Installing phpBB on your server

Discover just how easy it is to install one of the most popular open source bulletin board packages

As an open source package, phpBB has proved itself to be one of the most popular and fully featured forum titles available. With a price tag restricted to your download, there's no reason why you shouldn't try out this popular option.

As the software is powered by PHP and relies on a MySQL database, you'll need to make sure your hosting allows such a provision before downloading the full package and decompressing the phpBB archive to a local directory. You should then upload all the files to a web-accessible directory on your server, making sure to retain the existing directory structure. The 'config.php' will then need its permissions changed to 666 (-rw-rw-rw-) using your FTP client.

Point your web browser towards the directory to which you uploaded the forum pages, with the addition of 'install/install.php' to complete and submit the necessary information to claim ownership of your newly installed set of pages.

Once the basic configuration is complete, you should revisit the 'config.php' file through your FTP software and change the permissions to be writable only by yourself (644 or -rw-r--r-) before clicking the Complete Installation button available through the web interface.

phpBB should now be accessible. Before you announce your discussion pages to the world, remove the entire 'install/' and 'contrib/' directories to ensure the security of your pages. Should these be left in place, phpBB will not operate and a warning message will be displayed. With these directories deleted, you can now proceed to the phpBB Administration Panel by logging into your forum as an administrator, and by clicking on the link that becomes available at the foot of the page. Double-check the General Admin | Configuration settings are correct and your pages are now ready to be unleashed. ■

PART FOUR TOTAL CONTENT MANAGEMENT

It's never seen, but you'll depend on it – a content management system to control and serve up your site behind the scenes

Within the usability world, there's something called Pile Theory. This concept, driven by the square-orange-sunglasses-wearing usability experts determines that we naturally store things in piles. Just take a look at your desk and you'll probably find that this is the case. When you apply this to computers, there are also huge piles of content. This content is often related in some way, yet difficult to manage. This is where you need a Content Management System (CMS).

The purpose of a CMS is to provide an application for managing content in ways that are simple for your users. If you're creating a product website, you'll want to add product details, related information, customer comments, reviews, contact information, articles, member login areas and other facilities. Most websites that offer a similar service have similarly structured websites, and this is exactly what a CMS provides: a pre-built site that lets you concentrate on the content and not the mechanics of storing and organising it.

Staying on the web

The majority of CMSs that people seem to be using in recent times are web-based. This offers



Opensourcecms has live demos of every major, free PHP CMS package out there (which is most of them!).

the primary advantage of making the content available anywhere to restricted members, as well as the general public, on any computer with a web browser. Each web-based CMS will typically offer the kind of features that you may require for a typical product or information website, and it will all be accessible by using a web-based administration interface. This provides you with the ability to not only run a managed website with your content, but also to administer and update

your website content from wherever you happen to be in the world.

Whether you're looking for a free or commercial CMS, you won't have any trouble. Naturally, each has its own system requirements, and you should check that your hosting provider has support for these. As an example, one of the most popular CMSs is Mambo (www.mamboserver.com), and this software requires PHP and MySQL to run. With so many low-cost

>> Picking a Content Management System

Take charge of your website with one of these great, free CMS packages



>> Drupal

Drupal is a powerful and flexible content management system that supports standard CMS features, as well as features such as blogging, community discussion or even collaboration facilities. Drupal is very simple to use and is PHP- and MySQL-based. It also has support for a range of dynamic themes. All of this is augmented by a strong user management facility.



>> Mambo

Mambo has proved to be a popular open source CMS that's gone on to develop a strong community of users and developers. Facilitating the common needs of a CMS, Mambo has supplemented these features with corporate support, additional modules, and the whole shebang is simple to install with its web-based installation and configuration wizard.

Behind the scenes of a website isn't always pretty, but it really doesn't have to be.



hosting providers supporting PHP and MySQL, this shouldn't be too much of a problem, but make sure that it's an up to date version that supports everything your CMS needs. The vast majority of Open Source CMSs are PHP- and MySQL-based, and they're sure to work with most hosting providers. Some hosting companies even provide them out-of-the-box, with control panels like CPanel and Fantastico.

Mambo

Mambo is a great example of a flexible CMS and it's gained popularity in its features and ease of use. It's simple to add new content, arrange it into sections and to manage how users interact with that content. Mambo also provides features such as leaving comments on stories, users being able to amend content, and methods to manage how that content is distributed around the site. There's also a huge collection of plug-ins in case you need something that doesn't come packaged in the standard directory.

If Mambo isn't for you, another useful and simple CMS is Drupal (www.drupal.org). Drupal provides a powerful means of providing typical CMS features and also extends it with a strong templating system, so that you can

customise every detail of your site. Drupal has proved to be particularly popular for programmers wanting to take a CMS and modify the code to their specific needs, from politics site Of By And For (www.ofbyandfor.org) to the Firefox portal at www.spreadfirefox.com.

One of the slight disadvantages with CMSs is that you're more restricted in the layout and design of your site than if you used a 'built-from-scratch' site. The reason for this is that a CMS provides a template for the site and you need to keep within that template. You can still design around the template, and some CMSs are far more flexible than others, but the limitation is still present. The relative exception to this rule is Plone (www.plone.org). This is a CMS that provides an unbridled level of flexibility, but also involves more complexity. Plone is built on top of the Zope application server (www.zope.org) and is written in the increasingly popular Python programming language. Plone subscribes to a slightly different model of CMS management, providing a number of components that can be used to create rich and incredibly customised CMS sites.

Content Management Systems are useful and flexible tools that can save you having to develop the same kind of site over and over again. They provide a solid and consistent means of replicating common functionality across different sites and they also ensure that the functionality is written to a high specification. If you were to write one of the features in a CMS from scratch, it may work well, but the contributors who maintain these CMSs spend a lot of time improving, securing and refining each feature. This means that other people work at ensuring that the CMS works well and is as secure and stable as possible. This issue in itself can be a compelling reason to use a CMS, and when you factor in the time it saves you, they're an obvious choice.

Sticking to the script

In addition to your stock CMS installation, you're going to want to use some additional tools. You should check www.hotscripts.com for additional scripts and add-ons that can be useful, in addition to the add-ons for your choice of CMS. If you want to store your photos online, you should visit <http://gallery.sourceforge.net> for a PHP-based photo gallery management tool. Another useful tool is a form editor for Mozilla called Kupu (<http://kupu.oscom.org>); this is particularly useful for the Plone CMS.

>> Modules

Don't judge a CMS by what it can do out-of-the-box. The larger products on the web often have huge communities busily punching out modules that can radically reshape the program's features. However, be careful. Use too many modules, or simply badly programmed ones, and you can bring your whole server to its knees. In particular, avoid having a huge collection that all need to access your database to provide pieces of information, using cached data wherever possible. This keeps your system fast, even if the hordes of Atilla (or worse, Slashdot) should suddenly descend.



>> Plone

There's little doubt that Plone is the most capable CMS available, but this capability comes with a degree of complexity. Plone not only enables you to customise how users see your CMS, but how administrators get to use it. If you can spare the time to learn its many intricacies, Plone is easily the most flexible and capable CMS available right now.





PART FIVE

THE WIKI WIDE WEB

Are you ready to let your users take control of your content?
With a wiki on your server, anyone can edit your site

Wikis are simultaneously the most exciting and most dangerous type of website you can create. A standard website is there to be read, forums and comments create a conversation between its readers and ecommerce provides a marketplace, but a wiki means open season. Anyone can rewrite, create or delete your pages, editing whatever they like without having to run it past moderators or administrators.

When creating a wiki, the secrets are subject and community, not the actual software. Without anyone to post to it, content will quickly dry up. There's little point trying to set up a personal Encyclopedia Britannica when Wikipedia is

around, nor a personal wiki on your CD collection. Instead, the successful wikis take on smaller needs: a particular application, a television series that isn't Star Trek, or some other subject that can inspire you. Avoiding the usual suspects, try the dedicated gaming wiki at www.extra-life.org, **uk**, or the terrifying knowledgebase behind web-cartoon Homestar Runner at www.hrwiki.org.

Wikis come in all shapes and sizes, but always free. MediaWiki (www.mediawiki.org) is by far the biggest name, due to being the engine behind Wikipedia, but there are many more. Check www.opensourcecms.com for live trials of all of them.

In each case, a page looks like a standard web page, with the addition of a button named 'Edit This Page'. Click this and the page changes into a HTML editing window for you to rewrite as necessary. To create a new page, you simply type its name in as a link. Most wikis stick to the unwieldy 'CamelCase' format, in which typing 'MyTopic' would create the page 'My Topic'. Of late, newer wikis have moved across to 'Free Links', where that would be written in the form '[My Topic]'. In both cases, there are ways to disguise the page name for ease of reading, either by the wiki software breaking apart the two halves of a CamelCase word to display it, or via links like '[My Topic | Click here for more]'. →

Vandals are a perpetual problem on wikis. Spammers have begun targeting them directly in

"It takes a second to restore a vandalised page to its former glory ... users can repair damage faster than vandals can cause it"

an attempt to boost the popularity of their idiot sites, and being obscure is no longer enough to keep yourself safe. In the first instance, wikis don't have to be fully open. As the administrator, you can lock down pages wherever you like, hand out editing permissions to specific people, or insist that everyone registers an account before getting started. IP addresses are logged, and most of the major wiki engines offer the ability to ban difficult users.

Your real weapon, however, is that it takes a second to restore a vandalised page to its former glory, with every change logged and stamped by the system. Vigilant users, often watching their own pet pages and receiving notifications when anyone changes them, can repair damage faster than any vandal can cause it.

The biggest concern you'll have if setting up a wiki is legality. The law is fuzzy over how much liability you have over libel and copyright infringement, even if you post a disclaimer. Read how the larger sites handle their problems, and make sure to watch for trouble brewing. Wikis can be very rewarding, but they require a level of trust beyond any other form of website.



Behind the scenes on a Drupal-based site. A back-end doesn't have to look like your main site. Either there will be an administration interface, or a choice of theme.

>>Search engine optimisation

It's not just about Google; but that's a great place to start

It's no good having the world's greatest website if nobody knows it exists. Search Engine Optimisation (SEO) is the science of boosting your ratings in the major engines, and knowing exactly how to be found. There are plenty of tricks you can play, but we're not going to help you find out how to do those. Instead, here are a few things that will help you promote your page. In most cases, the only practical thing worth considering is manually submitting your URL to the biggest search engines: Google, MSN, Yahoo! and Ask Jeeves. You can safely skip any mass-submission tools – they cover the hundreds of utterly irrelevant engines out there that won't ever get you a single page view.

Whatever you do, don't be tempted to lie. Filling your page with pornographic tags or references to Viagra may snare a few readers, but really, why do you want them? They won't stick around when they realise they've been conned,

and you risk being booted out of the search engine's ratings as soon as it updates its search algorithms. A well-written, properly designed page will largely sell itself. All you need to worry about is providing the content.

In the first instance, web standards are your friends. Putting a page's title into a <H1> tag doesn't just make it bigger, it labels it as a heading. Using an image as a title may look pretty, but it won't get picked up by Google. If you do need image-based headers, make sure they feature the same text as the alt tag.

Finally, make sure that the writing is appropriate to your page. If someone is searching for 'cheap cars', their first results are going to say 'cheap cars', not 'affordable automobiles' or 'cut-price SUVs'. Someone who's already on your site may appreciate that kind of flowery prose, but they're much less likely to turn up to read it if they can't find it in the first place. ■



PART SIX WINDOW SHOPPING

Use your new site to draw additional revenue by selling products, services or downloads to your site visitors

The concept of ecommerce is now firmly established thanks to the likes of Amazon and eBay. Even the most nervous users are now reasonably happy to submit their credit card details for the lower prices in the promise that goods will arrive on their doorstep within a few days. Creating your own store from scratch will take an advanced understanding of dynamic scripting, as well as a higher-than-average understanding of database coding. But thanks to various off-the-shelf applications, even the most code-shy designer can get their own store up and running in a matter of hours.

Our recent Masterclass series on the open source shopping cart osCommerce (www.oscommerce.com) illustrated just how easy it is to get a store up and running, but there are many alternatives. Zen Cart (www.zen-cart.com), phpPay (<http://phppay.sourceforge.net>) and AllCommerce (<http://allcommerce.sourceforge.net>) provide alternative open source options to check out, while more established commercial offerings are available from Actinic (www.actinic.co.uk) and Miva (www.miva.com).

All these methods enable you to start a basic, functional store with just a little time and effort spent on getting things installed and configured. To make a success of your store, and to start making money, you'll need more than a few cheap prices linked to an 'add to cart' button.

Shoppers won't be making any orders if they feel your site isn't offering a genuine service. Your

store should look professional, offer comprehensive advice and guidance to new customers and perform in a manner that online shoppers have become accustomed to. Look towards the larger established online traders and learn from their experience to see just how the entire online shopping procedure works.

One aspect that will instil confidence in potential punters is the inclusion of a secure server as part of your checkout procedure. Many users are now aware enough to realise that without the familiar padlock appearing in the corner of their browser, they're risking having their

"Your store should look professional, offer advice to new customers and perform in a manner online shoppers have become accustomed to"

credit card details intercepted and will simply cancel their order and shop elsewhere.

You'll also need to consider payment methods that your store can provide. Accepting credit or debit card details is by far the most universally accepted method of payment and you would be well advised to open some kind of merchant account with an acquiring bank. Your bank will be best able to advise you here, but there are various options available, including the more basic service, which may be suited to the small business. This allows you to manually process orders by entering credit card details into a PDQ machine. More successful stores with a higher turnover may find investing in a payment service provider such as WorldPay (www.worldpay.co.uk) or protx (www.protx.com) are worth paying for, as funds will move quickly into your account and you'll have more time to spend developing your product range.

Of course, the smallest shops can always rely on old-fashioned cheque payment or introduce PayPal options quite easily, but you may find your customers aren't quite so forthcoming with payments, as they may feel uncomfortable about how genuine your store is, or simply forget to get around to posting your payment. But as long as you have something unique to sell and can offer competitive prices, efficient delivery and prompt customer service, there's no reason why your store shouldn't start to provide you with a substantial means of income. **PCP**

>>OPENING YOUR STORE

There are many obvious advantages to using open source shopping cart packages. The software is free to download and use and you can often find many extensible options that can be plugged into your store should you choose some more niche methods of selling.

However, you'll find that documentation tends to be basic and you'll need an understanding of the technologies involved if you plan to make the most of your shopping cart. We provided a comprehensive guide to getting osCommerce (www.oscommerce.com) up and running in a Masterclass series over PC Plus issues 227-229. However, you'll find that open source options tend to provide updated documentation through their relevant websites.

If you want to try a more simplified approach to getting your store up and running, Actinic Catalog (www.actinic.co.uk) may be more suited to your requirements. Documentation is thorough and much of the store management is handled locally on your system, rather than through a web-based interface that links directly to your store's MySQL database. The cost of such an option may be prohibitive, but with more accurate and reliable technical support, such an option may be better suited if you want your store up and running as soon as possible and you anticipate your online venture making enough money for you to cover your costs.



Payment providers such as WorldPay will help you process credit card payments online. Check out their websites for more information on what's required to set up your own merchant account.



An osCommerce-driven site provides all the functionality of a familiar shopping site, but it takes a little configuration to get going.

PCPlus GROUP TEST

EXTERNAL STORAGE

→ The entire device landscape painted for your pleasure

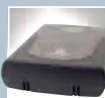


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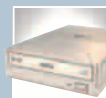
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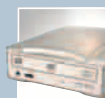
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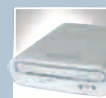
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**Editor's Choice**

Our top award for products that combine exceptional performance and quality with superb value for money

**Value Award**

Awarded to products that represent outstanding value for money, giving you more bangs per buck

**Value Award**

Awarded to products that represent outstanding value for money, giving you more bangs per buck



Carl Northwood
labs@pcplus.co.uk

Carl has been an IT journalist for five years and specialises in external storage. He's now full and looking for an upgrade.

Saving space

Carl Northwood sorts the divine external drives from the waste of space

The choice of external storage options has never been greater. Devices ranging from recordable CD and DVD drives to large capacity hard disks, flash memory cards and thumb-sized storage drives, means that there's a solution for all requirements. Whether this means burning a CD from a laptop while on the move, having access to a transportable library of images or movies, or just a mobile data repository, there's sure to be something to suit every need. But let's look more closely at why you shouldn't just stick with your PC's hard disk.

The most common reasons are related to portability and transferability of data, and the convenience and security of backing up to a removable data store. In many instances, having a mobile drive can be an efficient and relatively cheap way of quickly and easily moving files across different machines. Using fast

interfaces like USB 2.0 and FireWire to move gigabytes of information can take just minutes, and installing devices is a simple case of plug-and-play. Second, whether you've run out of internal storage space or just want a fail-safe back-up in case of PC problems, an external device will provide both extra capacity and an isolated place to keep any important files. Many users also find it useful to keep their files on removable media, such as CDs or DVDs, building up a library of source discs.

When it comes to external storage solutions, there are a great many to choose from, and it's important to get the right one for the task in hand. After all, there's no point in shelling out £100 for gigabytes of space in an external hard disk when all you need to do is move some image files or office documents between PCs.

So, without further ado, allow us to introduce 20 varying solutions that cover the big, the small and the medium budgets.



Sandisk Cruzer Titanium SDCZ3-512

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When buying a storage device, consider the connections, plus how fast the drive is in RPMs, and remember: the bigger the cache, the better it will perform.

Magnetic storage devices

Hard drives on the move

Current external hard disks range in size from about 20GB to 500GB. While smaller capacity drives are cheaper as regards ticket price, in terms of the price-to-capacity ratio, larger capacity drives prove better value for money. The price of such drives has never been better, which means that anyone with a reasonable budget can expand their storage capabilities.

A great alternative to buying a retail version of an external hard disk is to go down the DIY route. This involves buying a standard internal hard disk and housing it in an external drive caddy. Because internal drives are cheaper than their external counterparts, you're likely to find that it's possible to build a bigger drive for less money. Any good online retailer will sell external drive caddies, often for under £20. Finding a caddy with both USB 2.0 and FireWire

means that you won't have to compromise on connectivity. And, although you'll probably need to buy cables separately, this is a small price to pay for a versatile storage solution.

What other factors should you look for? Firstly, there is the connectivity factor: virtually all drives will offer a USB 2.0 connection, but some of the better alternatives will provide FireWire. Secondly, have a look at the specification of the drive: the faster the RPM (expect at least 7,200), and the bigger the cache, the better.

Finally, shop around! It seems an obvious point to make, but a little time and effort spent browsing hardware websites can be well worth it. A good starting point is to calculate the price-per-GB of the hard disk by simply dividing the price of the drive by its capacity. ■

SMARTDISK Crossfire XF 160

INFORMATION

PRICE £96 (£82 ex VAT)
DELIVERY £5 (£4 ex VAT)
SUPPLIER www.softjam.co.uk
INFO www.smartdisk.com
WARRANTY Two years



PCPlus ratings

SMARTDISK CROSSFIRE XF 160



The Crossfire XF 160 from SmartDisk is one of only two featured external hard disks to provide both USB and FireWire connectivity options and thus covers its bases, with both types of cable bundled. The case isn't too large or weighty and feels reasonably sturdy, while not being so aesthetically appealing. The power supply is about the same size as a standard laptop model and, unlike some of the others here, won't provide an obstacle to portability.

The performance of this drive across both USB 2.0 and FireWire standards is the best of all the hard disks on test in terms of read levels, with particularly notable scores in the shape of 954MB/s burst speed and 464MB/s average read speed. When it

comes to writing speeds, the Crossfire's speed of 191MB/s average write was the best USB performance. Its FireWire 400 result was also better than the LaCie drive, these being the only two drives that offer a FireWire connection.

The real-world test result of 2.78MB/s doesn't quite tie in with this speed revelation, but is nevertheless better than good. And, at a cost of only 60p a gigabyte, the SmartDisk Crossfire is only beaten on price-per-capacity by the Iomega drive (reviewed below) and is identical to the LaCie Big Disk

(reviewed on page 95). This means that it's a very good price for its size. SmartDisk's drive is far and away the quickest in general, all things considered, and this is one of the major selling points of the Crossfire. Who needs size when you have a turn of speed like this?



IOMEGA HDD DHD250-U

INFORMATION

PRICE £111 (£94 ex VAT)
DELIVERY £6 (£5 ex VAT)
SUPPLIER www.dabs.com
INFO www.iomega.co.uk
WARRANTY Two years



PCPlus ratings

IOMEGA HDD DHD250-U



This drive is only beaten on pure capacity by the LaCie d2 Big Disk, with a Windows formatted capacity of 232GB. But, in terms of comparative price, it stands head and shoulders above the competition at 45p a gigabyte. This is exceptional value whichever way you look at it. Even if you don't take this into account, the price is fairly good for any external hard disk, especially for a well-known brand like Iomega. Aside from the Fujitsu Handy Drive, which is a laptop hard disk in an external shell, this is the lightest magnetic device featured, and this is noticeable when you pick it up. It also has the smallest housing of any of the magnetic drives, again with the exception of Fujitsu. The combination

of these features makes for a very portable storage solution. The drive caddy isn't attractive, in grey and black but, for most users, this won't be important at all. A slight downside to the DHD250-U is its lack of FireWire support; it demands access to a USB 2.0 port.

Relative to the LaCie drive, its performance is good in terms of read speeds and CPU utilisation, but it didn't produce such impressive random access figures. In data writing tests, the Iomega was second only to the

SmartDisk (average write speed), while our real-world test revealed it as the fastest drive, performing at a speed of 6.25MB/s. An important side note is that it makes a lot of noise, which isn't good to say the least. It really could have done with Iomega putting more sound dampening in its chassis.



LACIE d2 Big Disk 400GB

INFORMATION

PRICE £241 (£205 ex VAT)
DELIVERY £6 (£5 ex VAT)
SUPPLIER www.savastore.com
INFO www.lacie.co.uk
WARRANTY Two years



PCPlus ratings

LACIE D2 BIG DISK 400GB

Value: ●●●●●●●●●●●●●●●●

Features: ●●●●●●●●●●●●●●●●

Performance: ●●●●●●●●●●●●●●●●

OVERALL 9

The d2 Big Disk is far and away the largest capacity magnetic device on test at a whopping 400GB, though its NTFS-formatted capacity is below this at 372GB. Similar to the SmartDisk drive, this model works out at about 60p a gigabyte, the capacity being ramped up by LaCie's use of two actual hard disks in its product. As with the SmartDisk Crossfire, both FireWire 400 and USB 2.0 connectivity ports are present – a definite plus point – though you would expect nothing less for such a high capacity drive at this price point.

Taking this even further, it also has support for FireWire 800, and even comes with a FireWire 800 PCI interface card in the box, so there's no reason

not to use it. Inevitably, the d2 Big Disk isn't exactly small, but it's been well-designed for its size, and the power supply is unobtrusive. However, we simply have to mention the weight of the unit, which, at 2,475g, is at least twice as heavy as all the other magnetic drives and thus limits its potential in the portability area. Therefore, this drive is probably best suited as some kind of stationary back-up device. Compared to the next biggest drive, the Iomega DHD250-U, this has superior random access times,

but is just off the pace in read speeds. With average write speeds of 18.8, 296 and 48.2MB/s, LaCie was just off the top pace in this field across the performance area, though its super-fast FireWire 800 has no comparable alternatives. The real-world test speed of 5.56MB/s was exceptionally fast.



FUJITSU Handy Drive Data Edition

INFORMATION

PRICE £89 (£76 ex VAT)
DELIVERY £5 (£4 ex VAT)
SUPPLIER www.pcnextday.co.uk
INFO www.fujitsu.com
WARRANTY Two years



PCPlus ratings

FUJITSU HANDY DRIVE DATA EDITION

Value: ●●●●●●●●●●●●●●●●

Features: ●●●●●●●●●●●●●●●●

Performance: ●●●●●●●●●●●●●●●●

OVERALL 7

Portability is the name of the game for the Fujitsu Handy Drive. Its weight and dimensions of 185g and 9x73x132mm make it far and away the best choice in this area. Albeit a minor factor, it also looks fantastic and feels sturdy in our critical hands, which is good news for what is such a small and vulnerable device.

Something else in its favour is the lack of reliance on a dedicated external power supply, as all of the unit's power requirements are met by the USB interface. This is great news, because it gives the drive a level of portability unachievable by the other drives in our test that need to travel everywhere with their power adaptors. The Handy Drive can only be connected to your PC through its single USB port, which will

no doubt disappoint fans of FireWire. As might be expected, the Handy Drive only runs at 4,200 RPM, which is due to the fact that it's a laptop-specification drive, with a 2.5in form factor and slower spin speed. This has a direct bearing on its performance levels, with relatively poor figures of 20ms random access time and 13.7MB/s average read speed. In our real-world test, the data speed of 1.34MB/s was also below average, and this is reinforced by the low average write time of 12.8MB/s. Value-wise, in terms of price compared to capacity,

this is the most expensive drive of the group, coming in at nearly £1.50 a gigabyte, which is more than 50p a gigabyte greater than the next most expensive model. This is quite a premium for a drive whose only advantage is its extra portability.



BUFFALO Drive Station

INFORMATION

PRICE £73 (£62 ex VAT)
DELIVERY £6 (£5 ex VAT)
SUPPLIER www.dabs.com
INFO www.buffalotech.co.uk
WARRANTY Two years



PCPlus ratings

BUFFALO DRIVE STATION

Value: ●●●●●●●●●●●●●●●●

Features: ●●●●●●●●●●●●●●●●

Performance: ●●●●●●●●●●●●●●●●

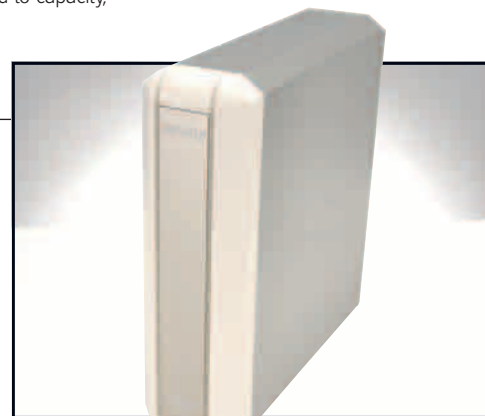
OVERALL 7

This external hard disk is ideally suited as an accompaniment to the Buffalo Link Station, as a networked storage solution for sharing data across several linked machines. It does function as a standalone storage device, but is aimed at the networked corner of the market. While it only offers some 80GB storage space, for most small-to-average-sized networks, this should prove ample capacity. Again, FireWire supporters will be disappointed at the omission of their connector of choice. Instead, the Buffalo relies on USB 2.0. Looks-wise, the Drive Station is smart, especially when put side by side with its Link Station sibling. It would be ideal for a small office, with the robust casing

being moderately sized and weighted for carrying it around. Interestingly, the case is designed to act as a heatsink, which should help to keep the hard disk cool.

On the performance front, the Drive station places quite a high level of strain on the CPU, but its random access and read speeds are respectable. An average write speed of 16.7MB/s was comparatively low and this is backed up by the slow real-world test speed of 1.20MB/s. As regards price and size, this drive costs

92p a gigabyte, making it the second most expensive model. A novel feature of this product is its 'auto power on' function, which can be toggled on or off using the switch at the back, enabling the drive to power up when the attached machine is switched on.



Optical storage devices

Format is the key to DVD success

Optical is arguably the fastest evolving form of storage. In the purest form, this means speed. The current generation of DVD writers offer writing speeds of 16x across both DVD+R and DVD-R formats, with both + and -RW speeds ranging from 2x to 8x depending on the drive. They also offer impressive CD writing/rewriting speeds. In fact, these are now so good and cost so little that it really isn't worth just buying a standalone CD writer. The next generation of optical drives, including Blu-ray, is already undergoing the final stages of development.

While it's now fairly standard procedure for DVD writers to support both DVD+ and DVD- formats, it's still uncommon to find drives that also support the DVD-RAM format. DVD-RAM remains the outsider in the format wars, but is possibly the best choice for those wanting long-term, reliable

storage. The popularity, availability and cheapness of consumer DVD players are partly responsible for the poor uptake of the DVD-RAM standard.

A relatively new trend among recordable DVD drives is support for writing to dual-layer DVDs. Effectively, this was a logical progression for the technology, as dual-layer discs are the media of choice for commercial DVD videos.

The upside of dual-layer DVDs is their capacity, which, at about 8.5GB, isn't far off double that of single layer disks, which are 4.7 GB. Writing times are higher on dual layer disks and the need for such technology is quite 'niche' at present, but there's no doubt that this will soon become an industry standard technology.

A massive consideration for optical storage is media. In many ways, this is more important than the drives themselves. Currently, 16x or dual-layer



blank DVDs are tricky to find and expensive to acquire, but this is to be expected and is in keeping with upgrades in drive speeds; just as 4x and 8x disks were expensive at first, so it is with the faster media.

With the wider-scale permeation of the drives into the consumer mass market, such factors will inevitably improve. ■

IOMEGA Super DVD Writer 16x

INFORMATION

PRICE £80 (£68 ex VAT)
DELIVERY £6 (£5 ex VAT)
SUPPLIER www.dabs.com
INFO www.iomega.co.uk
WARRANTY Two years



PCPlus ratings

IOMEGA SUPER DVD WRITER 16X

Value: ●●●●●●●●●●

Features: ●●●●●●●●●●

Performance: ●●●●●●●●●●

OVERALL: 8

The Iomega Super DVD Writer 16x allows anyone with access to expensive dual-layered DVD media to write up to 8.5GB on a single disc, albeit only on Windows-based machines. It supports both DVD+R/RW and DVD-R/RW formats and performs standard CD writing, with top speeds of 40x and 24x for CD-R and RW respectively (using the USB 2.0 interface). It offers 16x performance with DVD+R, but only 8x with DVD-R, with both RW formats being 4x at best. The design is a little chunky, but it isn't too heavy or large, and the same can be said of the power supply, meaning that the whole unit can be easily carried. Iomega provides a good software bundle that includes Adobe Photoshop Album 2 and both DVD

playback and writing software. Specification and performance-wise, the Super DVD offers a 3MB buffer and, in our tests, wrote a dual-layer DVD+R in just under 44 minutes. Something that's worthy of note is that, with our high-quality Verbatim 16xDVD+R test media, the drive dropped down to 8x from an initial speed of only 12x. The fact that the Iomega Super DVD Writer offers 16x performance with DVD+R but not DVD-R is a slight disappointment in itself. Similarly, it only writes dual-layer disks at 2.4x, while some of its



competitors go to 4x. In our real-world performance test, the Super DVD wrote our test data set at 3.13MB/s. This was one of the fastest results, only just being beaten by the BenQ EW162I. Add to this the fact that it's also one of the cheapest devices in the optical category and you have a more than decent drive on your hands.

BENQ EW162I

INFORMATION

PRICE £125 (£106 ex VAT)
DELIVERY £5 (£4 ex VAT)
SUPPLIER www.softjam.co.uk
INFO www.benq.co.uk
WARRANTY One year



PCPlus ratings

BENQ EW162I

Value: ●●●●●●●●●●

Features: ●●●●●●●●●●

Performance: ●●●●●●●●●●

OVERALL: 8

This is another drive that offers dual-layered DVD writing in an external unit (should the cost and availability of media not be a problem). The EW162I supports both major DVD formats, giving 16x and 4x writing and rewriting speeds across both at best, with CD writing and rewriting at 40x and 24x respectively.

In our tests, this drive wouldn't reach 16x, but managed to write a dual-layer DVD+R disk in a fraction over 46 minutes. This isn't quite as fast as the Iomega Super DVD, but comes within a respectable three minutes of it. The BenQ did perform better in the dual-layer read test, however, edging out the Super DVD by a quite significant margin of around seven minutes.

Although, like the Iomega, it has a ceiling of only 2.4x in dual-layer performance. And it wrote a DVD-RW faster by a clear four minutes.

Also impressive was the EW162I's performance in our real-world benchmark test. It turned out to be the fastest of all the optical drives, writing 100MB files in just 29 seconds, which works out at an excellent 3.45MB/s. BenQ's software bundle most notably includes WinCinema, and you're also provided with some blank media. Although



slightly boxy in design, it looks good and is able to stand on its side. Sadly, it doesn't have the most inspiring chassis, which feels somewhat fragile.

The power indicator on the back is a departure from the norm, because this would normally be found on the front of the device.

MSI DRE8

INFORMATION

PRICE £75 (£64 ex VAT)
DELIVERY £6 (£5 ex VAT)
SUPPLIER www.ndc.co.uk
INFO www.msicomputer.co.uk
WARRANTY One year



PCPlus ratings

MSI DRE8

Value ●●●●●●●●●●
Features ●●●●●●●●●●
Performance ●●●●●●●●●●
OVERALL 7

MSI's DRE8 dual-format DVD writer is supplied with copies of Nero Burning ROM, PowerDVD, PowerDirector and PowerProducer. This is a great selection of software, particularly considering that the MSI drive is the cheapest in our round-up. It has top speeds of 8x DVD+R and DVD-R, 4x at DVD+ and -RW and 40x/24x CD-R/RW performance. In our tests, it took over 29 minutes to write a DVD-RW and over 10 minutes to write a DVD+R. The real-world test gave us a time of 51 seconds to write 100MB files to disk, which works out at a rather poor 1.96MB/s; this was the slowest of the optical drives by over 10 seconds.

It's one of the better-looking drives on test, the chassis assembly having

an attractive translucent exterior. Size and weight are directly comparable to all the other drives, so the portability issue is neither here nor there. The DRE8 uses USB 2.0 as its interface, so

FireWire enthusiasts will be somewhat disappointed by its exclusion.

At £75 including VAT, this is the cheapest DVD writer of the five featured by about £5. Unfortunately, the DRE8 is the slowest drive here without exception, only being rated up to 8x maximum. In addition, even though it



supports dual-format, it doesn't support dual-layer media. In these ways, this particular writer is slightly out of place when compared to the other entries in the Group Test this month. However, it's probably worth noting that this is the only external DVD writer that MSI currently manufactures.

LG GSA-5163D

INFORMATION

PRICE £99 (£84 ex VAT)
DELIVERY £5 (£4 ex VAT)
SUPPLIER www.novatech.co.uk
INFO www.lge.co.uk
WARRANTY One year



PCPlus ratings

LG GSA-5163D

Value ●●●●●●●●●●
Features ●●●●●●●●●●
Performance ●●●●●●●●●●
OVERALL 9

The first thing you notice about the LG GSA-5163D is its striking design. The distinctly Apple-esque look won't be to everyone's taste, but we think it looks the best of the bunch with its metallic silver and white finish, even if it does feel a tiny bit plasticky. The second major point of note about this drive is that it's the only one here that supports DVD-RAM in addition to the more common DVD-R/RW and DVD+R/RW formats. And, reassuringly, it also offers support for dual-layer media. When you consider that this isn't even the most expensive drive here, it looks like a great choice from the outset.

In our tests, it wrote a DVD-RAM from start to finish in 39 minutes, while a dual-layer DVD+R disk took a very

healthy 27 minutes. The drive writes DVD+R and -R at 16x, DVD+RW at 8x, DVD-RW at 6x, DVD-RAM at 5x, and it offers 4x on dual-layer DVD+R writing. Dedicated CD performance is quoted at 40x and 24x for CD-R and CD-RW discs respectively. LG even has its connectivity bases covered, providing two FireWire ports and one USB 2.0 port. Bundled software comes in the shape of Nero Express, PowerDVD and PowerProducer Gold – another solid software package.

What really marks this writer out is its consistency, versatility and, above all



else, reliable performance across the board. The word 'workhorse' springs to mind, and for a DVD writer, this is no bad thing.

In the real-world test, its speed of 3.03MB/s is very respectable, and only fractionally behind the lomega and BenQ drives. The price of under £100 makes it an absolute bargain.

PLEXTOR PX-716UF

INFORMATION

PRICE £138 (£117 ex VAT)
DELIVERY £6 (£5 ex VAT)
SUPPLIER www.dabs.com
INFO www.plextor.co.uk
WARRANTY Two years



PCPlus ratings

PLEXTOR PX-716UF

Value ●●●●●●●●●●
Features ●●●●●●●●●●
Performance ●●●●●●●●●●
OVERALL 9

With USB 2.0 and both 6-Pin and 4-Pin FireWire ports, the Plextor PX-716UF is versatile in connectivity terms and, interestingly, it even has a switch to go between USB and FireWire modes. It's one of the larger external optical drives on test, with dimensions of 54x184x266mm, though it isn't noticeably any heavier than the others.

The metallic silver finish of the curved sides lends a stylish look to the drive. In theory, the PX-716UF offers speeds of 16x DVD+R and DVD-R, 8x +RW, 4x -RW and 4x DVD+R dual-layer. In addition, it also burns CD-Rs at 48x and RWs at 24x, which is some of the best CD performance of the drives in this round-up. The sub-19 minute time it takes to burn a dual-layer DVD+R is

far and away the quickest of all the dual-layer capable writers on show. Remarkably, in this test, it outperformed its own specification, reaching 6x while burning the dual-layer disc. In our real-world test, its speed of 2.70MB/s didn't quite go along with the other results, which otherwise put this as one of the fastest drives on test.

Plextor's software bundle is comprehensive, including copies of Nero, Pinnacle Instant CD/DVD and Pinnacle Instant Cinema. One serious downside to the PX-716UF is that it only



reads DVD-ROMs at 2x. This aside, it's easily one of the fastest writers in this group test. It also has the best CD writing performance.

It's great to see that Plextor promises support for the dual-layer DVD-R format when it arrives by means of a firmware upgrade to this model.

Connectivity

USB isn't the be-all and end-all when it comes to external storage

Despite how it may look at first glance, external storage connections aren't just limited to USB. There are FireWire options for many devices, too, and a few new offerings in the pipeline that promise to change the way we think about portable data.

The SATA interface for hard disks was originally designed to enable hot-swapping of drives, but implementation problems held this side of the technology back. You can expect this feature of SATA technology to eventually appear in a later standard, which will open up entirely new possibilities for super high-speed external hard disks and optical drives. SATA is capable of much faster transfer rates, too, up to a theoretical 600MB/s, though the first release of the standard offers only a 150MB/s transfer rate. This is only marginally faster than the top-of-the-line 133MB/s PATA standard. This is not wholly significant for now, though, as the hard disks themselves are unable to push data out at a rate faster than this.

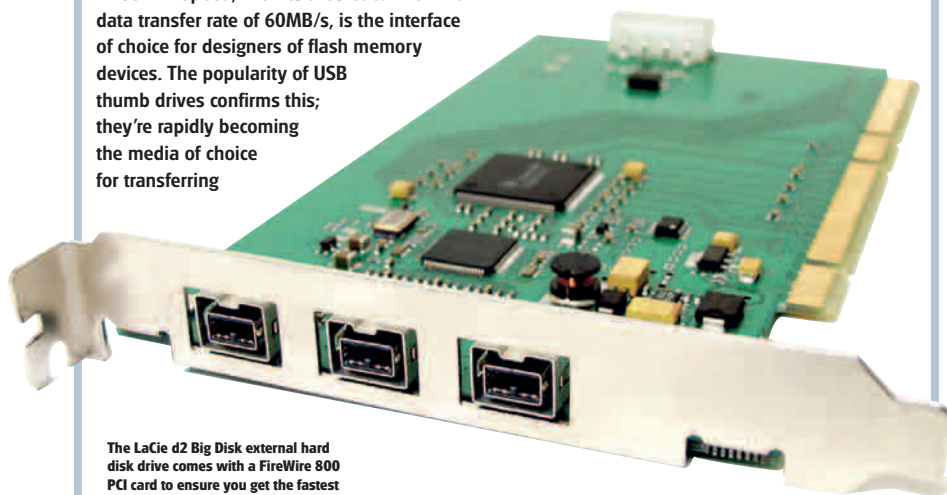
USB Hi-Speed, with its theoretical maximum data transfer rate of 60MB/s, is the interface of choice for designers of flash memory devices. The popularity of USB thumb drives confirms this; they're rapidly becoming the media of choice for transferring

data between computers, whether it's an Apple Mac or a PC.

Wireless USB products are expected to become available by the end of 2005, which will give exciting new Bluetooth-like connectivity to devices like digital cameras, mobile phones and external hard disks. You'll be able to rapidly make ad-hoc connections between your MP3 player and your PC, or between your digital camera and your printer, for example.

FireWire was given a facelift with the FireWire 800 standard, promising maximum data transfer rates double that of the already very fast FireWire 400.

FireWire is still quite rare when it comes to external hard disks, it would seem. Only two of the five external hard drives in our test feature FireWire 400, with only one of those supporting FireWire 800. ■



The LaCie d2 Big Disk external hard disk drive comes with a FireWire 800 PCI card to ensure you get the fastest possible performance.

Miniaturisation

The battle between form and function

Size is an important consideration for an external storage device, as the whole idea of these units is to make your data portable. Devices offering smaller capacities, particularly those with 20GB, 40GB and 80GB capacities, tend to come in smaller cases, simply because this is the area where low-capacity hard drives can compete best against price-efficient high-capacity drives. Such drives also have the advantage of being available in the smaller 2.5in hard disk shells, which is particularly beneficial in portability terms, but will cause these drives to be slower than their 3.5in counterparts.

While USB thumb drives, with their flash memory, seem to be getting smaller all the time, there's a limit to how small CD and DVD drives can get, simply because of the size of the media themselves. Hard disks, on the other hand, contain spinning platters very similar to CDs, but these platters are variable in size because they're internal and never need to be removed or swapped around. This is why hard disks can be made in the laptop-spec 2.5in width, and also explains Toshiba's new range of hard disks, for example, which measure just 1.8in wide and are available in capacities ranging from 5GB to 60GB. Kingston has a 5GB hard disk called the DataPak, which is housed inside a standard notebook PC Card. Perhaps even more impressive is the Hitachi Microdrive – a mechanical hard disk in a Compact Flash card shell – which is now available in a 6GB version.

Eventually, smaller miniaturised technology will permeate into the mainstream just as it did with 3.5in floppy drives and LCD monitors. There's also the kind of 'relative miniaturisation', perhaps better called optimisation, that we're seeing going on in the removable storage area, which describes the way that CD-type media is staying the same physical size but growing in capacity. CDs with 0.7GB, DVDs with 8.4GB, and Blu-ray with about 50GB discs, are all in the pipeline. ■

Flash memory storage devices

Sizing up the small guys in terms of speed and versatility

When you think of flash memory storage devices, the first thing that springs to mind is memory cards; the type most often employed in digital cameras, mobile phones and other portable devices. Such cards come in many different formats, including MMC, SD, Compact Flash, XD and Memory Stick, but the one thing they all have in common is that they use flash memory technology. USB thumb drives, on the other hand, use flash memory but are united by their common USB interface, making them accessible products for all PC users, and very convenient devices for moving small amounts of data between machines. We put a range of these USB thumb drives to the test in this round-up.

The size of these drives typically ranges from 16MB to 1GB, though we do have one thumb drive

on test with an unformatted capacity of 1.5 GB. Because of this, it's possible to get some thumb drives that suit particular uses better than others. For example, a 64MB thumb drive can be used for transferring image files or office documents in place of the antiquated floppy disk, but isn't likely to replace the need for rewritable CDs. However, the thumb drives with capacities of 512MB and greater can do exactly that. While considerably more expensive than a CD, a thumb drive is a great way to minimise the wastage from using single-write CDs to move files between computers.

While USB connectors are the standard, there are some variations worth knowing about. Devices using Full-Speed USB 1.1 have a theoretical maximum transfer rate of 1.5MB/s. Those using true Hi-Speed USB 2.0 have a potential data-rate

ceiling of 60MB/s. Although these rates are not realised in operation, they provide an insight into the differences between the two versions of the USB standard. ■



IOmega Micro-Mini

Despite having an unformatted capacity of 512MB, the Iomega Micro-Mini has one of the smallest form factors you're likely to see from a removable flash memory device. It's small and light and comes complete with three interchangeable coloured covers. These afford a small degree of protection for the drive, as the connector can be swung in and out of the cover. At £49, it works out at about 10p a megabyte, so it isn't one of the cheapest drives on test, but the size and portability may be worth the high outlay. In our performance tests, it fared well, with a random access speed of 0.9ms. An average write speed of 10.8MB/s is only bettered by the Sandisk Cruzer, while in our real-world test, the Micro-Mini had one of the best results, recording 0.13MB/s. There's also a 1GB version.



INFORMATION

PRICE £52 (£44 ex VAT)
DELIVERY £4 (£3 ex VAT)
SUPPLIER www.ebuyer.com
INFO www.iomega.co.uk
WARRANTY Two years

PCPlus ratings

IOmega MICRO-MINI

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
OVERALL	9

MSI Mega Cache 15

The Mega Cache 15 from MSI is easily the most distinctive flash drive here. With a Windows formatted capacity of 1.36GB, it stands comfortably on its own. From a quoted 1.5GB capacity, the Mega Cache loses quite a lot of space in formatting. It is, however, the largest physical drive, but is still small and lightweight enough to offer ease of portability. The design incorporates a fold-out USB connector, which could break easily, but also has a locking mechanism to keep the USB plug tucked away.

This drive is terminally slow, with an access time of 33.2ms and an average read time of just 4.5MB/s. In our real-world test, MSI's drive was average, managing 0.10MB/s. A major factor in favour of this drive is its price: at just 3p a megabyte, it compensates for its slowness.



INFORMATION

PRICE £53 (£45 ex VAT)
DELIVERY £8 (£7 ex VAT)
SUPPLIER www.scan.co.uk
INFO www.msicomputer.co.uk
WARRANTY One year

PCPlus ratings

MSI MEGA CACHE 15

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
OVERALL	8

SANDISK Cruzer SDCZ3-512

With its retractable USB connector and smart, compact design, the SDCZ3-512 is a smart piece of kit. The metal case is excellent, while the locking mechanism for the retractable USB connector is well made and won't move unless correctly handled. Its 498MB formatted capacity from 512MB unformatted is a good size for a flash drive, meaning that wasting CDs on smaller files will be a thing of the past. An average read speed of 14.8MB/s is impressive, beating the next best drive in this field, the PNY Attaché, by nearly 5MB/s. In terms of average write speed, this was easily the best drive, coming in at 14.1MB/s. Its real-world test speed was also good, running at 0.13MB/s, which was second only to the PNY Attaché. It's also worth noting that Sandisk covers this product with a five year warranty.



INFORMATION

PRICE £50 (£43 ex VAT)
DELIVERY £2 (£1 ex VAT)
SUPPLIER www.picstop.co.uk
INFO www.sandisk.co.uk
WARRANTY Five years

PCPlus ratings

SANDISK CRUZER

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
OVERALL	8

PNY Attaché

PNY's Attaché has just the right balance to make it the best all-round flash drive on test. It has a 1GB unformatted capacity (reduced to 983MB after Windows formatting). It has a nice compact design that isn't too flashy, but be careful not to lose the removable lid. Although its random access time of 6.3ms was high, the average read figure of 10MB/s was above average. Despite the HD Tach average write speed showing up as just 4.6MB/s, the PNY Attaché's performance in the real-world test was nothing short of superb. A speed of 0.25MB/s was nearly twice as fast as its nearest competitors. All in all, the Attaché comes recommended, especially in view of the fact it works out at 5p a megabyte. The Attaché provides a huge amount of storage and quality for a budget price.



INFORMATION

PRICE £53 (£45 ex VAT)
DELIVERY £4 (£3 ex VAT)
SUPPLIER www.ebuyer.com
INFO www.pny.co.uk
WARRANTY Two years

PCPlus ratings

PNY ATTACHÉ

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
OVERALL	9

IMATION HMDS-128C

With just 128MB of unformatted space, the Imation HMDS-128C is on a par with the PNY Evolution Attaché in terms of capacity. This limits its use, but makes it an ideal alternative for transferring files between PCs. The size and weight of the device means it can be easily carried on a keyring, but it does have a flimsy case. A random access time of 1.0ms was only matched by the PNY Evolution Attaché and marginally beaten by the Iomega Micro-Mini, while its average read time of 76MB/s was by no means the worst. An average write speed of 74MB/s was respectable, though the 0.06MB/s speed for the real-world test was disappointing. In short, the HMDS-128C is a cheap, low capacity storage device that's ideal for fiddly and frequent file transfers. Value wise, the HMDS-128C is about 12p a megabyte.



INFORMATION

PRICE £15 (£13 ex VAT)
DELIVERY £4 (£3 ex VAT)
SUPPLIER www.ebuyer.com
INFO www.imation.co.uk
WARRANTY Two years

PCPlus ratings

IMATION HMDS-128C

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
OVERALL	9

PNY Evolution Attaché

The most outstanding feature of the Evolution Attaché is its integrated smart card reader/writer. This feature supports a variety of smart card formats, the most notable being SD, MMC, MemoryStick and Mini SD. This obviously affects the design of the drive, making one end larger than the other. The inclusion of the smart card reader makes the Evolution Attaché the only expandable thumb drive on test. While both this drive and the Imation drive have unformatted capacities of 128MB, the formatted 119MB of the Evolution is below the 124MB managed by the Imation HMDS-128C. A good 1.0ms random access time was accompanied by an average read time of 71MB/s. However, a poor average write speed of just 1.7MB/s and 0.06MB/s in our real-world test let things down.



INFORMATION

PRICE £14 (£12 ex VAT)
DELIVERY £4 (£3 ex VAT)
SUPPLIER www.ebuyer.com
INFO www.pny.co.uk
WARRANTY Two years

PCPlus ratings

PNY EVOLUTION ATTACHÉ

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
OVERALL	8

EVESHAM SilverSTOR 500Q

INFORMATION

PRICE £1,643 (£1,398 ex VAT)
DELIVERY £40 (£34 ex VAT)
SUPPLIER Evesham Technology
 01923 22 2101
INFO www.evesham.com
WARRANTY One year, return to base

SPECIFICATION

TYPE Network Attached Storage (NAS)
CPU 2.4GHz Intel Celeron
CAPACITY 800GB
OS Windows Storage Server 2003

The SilverSTOR 500Q represents the entry point into an extensive range of NAS appliances offered by Evesham Technology, and delivers a strange brew of network storage features. For starters, this compact desktop chassis isn't purpose-built for the job and is actually a BioStar Mini-PC. Consequently, you get superfluous features such as games ports, S-Video header cards and sound surround speaker sockets.

On the plus side, it comes with Windows Storage Server 2003 (WSS2003), which provides a wealth of features that makes this a powerful storage appliance. The price is comparatively high, but one reason for this is that Evesham has also included

support for iSCSI on the review model. Support is implemented as a plug-in module supplied by FalconStor, which realistically is too heavy duty a solution for small businesses.

Key hardware components look up to the job, with a 2.4GHz Celeron processor

teamed with 512MB of PC3200 SDRAM memory. Storage is handled by a brace of 400GB SATA hard disks but, as with the TeraStation, these are fixed in an internal cage. However, they're easier to remove if required as the lower drive is held in a simple sled that can be withdrawn once the side panels have been removed. The embedded VIA SATA controller supports RAID-0 and RAID-1 with the drives preconfigured as a 200GB fault tolerant mirror. The OS doesn't play a part in RAID



PCPlus ratings

EVESHAM SILVERSTOR 500Q

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
OVERALL	6

management, and though WSS2003 supports RAID-5 arrays, these can't be implemented in the 500Q as there aren't enough facilities to add a third internal drive. Only a pair of SATA interfaces is provided and the single PCI slot on the BioStar motherboard is taken up by an Intel Gigabit Ethernet card. As with the NAS 200d and the TeraStation, the USB 2.0 ports can be used to attach external hard disks.

The browser interface provides remote management access to the appliance, where you can create volumes, set up network shares and designate user and group access permissions. Disk space usage can be controlled using quotas applied to specific users, and you get the same good client support as that provided by Iomega's NAS 200d. However, a glance at the Shares tab in the interface shows the directory quota option isn't

provided, and neither is file screening (which enables you to block file types from being copied to the appliance).

Setting up iSCSI targets is more complex than for the Classic 340, as you need to create portals and iSCSI virtual disks. Each remote system that accesses the iSCSI targets must log its initiator on the appliance first. You select those that can access the target and iSCSI virtual disk will appear as a local hard disk to each system which can be configured using the Windows Disk Administrator. It's a great idea if you want strict control over who can access iSCSI targets, but few small businesses will need this level of sophistication from a desktop.

The SilverSTOR 500Q delivers a mixed bag of features. The Windows OS provides useful tools but storage expansion is limited and the extra iSCSI facilities are unlikely to impress.

BUFFALO TeraStation

INFORMATION

PRICE £675 (£574 ex VAT)
DELIVERY £10 (£9 ex VAT)
SUPPLIER Broadbandbuyer.co.uk
 0870 766 5175
INFO www.buffalo-technology.com
WARRANTY Two years return to base

SPECIFICATION

TYPE Network Attached Storage (NAS)
CPU 266MHz PowerPC
CAPACITY 1TB
OS Linux Kernel

PCPlus ratings

BUFFALO TERASTATION

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
OVERALL	8

The TeraStation stands out from the crowd by offering a full 1TB of storage at a very tempting price. It achieves this by using a quartet of low cost ATA/100 hard disks and a simple controller board with a basic 266MHz PowerPC processor and 512MB of embedded SDRAM memory.

It's a sleek-looking cube, but further cuts are made internally as the hard disks are very difficult to remove (they're mounted in a cage buried in the guts of the appliance). The TeraStation uses a basic Linux kernel but RAID options are good, as the drives can be configured as individual units, a single stripe, dual 250GB mirrors or a triple disk RAID-5 array with the fourth storing parity data. The bundled TeraNavigator utility makes

light work of installation and the browser interface is simple to use.

Client support only extends to Windows and Mac systems but, as with all the other appliances on review, it can also function as an FTP server. Security features are limited, as you only control access by user or group membership and disk quotas are not supported.

Back-up options are good, as eight different full or differential tasks can secure data from selected shares and destinations, including any locally attached USB drives. You can also

copy data to another TeraStation. The bundled client back-up software is more basic than Iomega's utility, but users can schedule jobs to copy their own data to the appliance.

It's clear that sacrifices have been made to get the price down, but as a basic small business NAS appliance, the TeraStation is very hard to beat.



IOMEGA NAS 200d

INFORMATION

PRICE £1,535 (£1,306 ex VAT)
DELIVERY £15 (£13 ex VAT)
SUPPLIER Iomega Europe
 020 7216 0003
INFO www.iomega.com
WARRANTY Two years return to base

SPECIFICATION

TYPE Network Attached Storage (NAS)
CPU 2GHz Intel Celeron
CAPACITY 500GB
OS Windows Storage Server 2003

PCPlus ratings

IOMEGA NAS 200D

Value ●●●●●●●●●●

Features ●●●●●●●●●●

Performance ●●●●●●●●●●

OVERALL 8

Iomega has been in the NAS market for some time, and knows a thing or two about design too, as its NAS 200d is the best-looking desktop unit. It packs a decent specification that includes a 2GHz Celeron processor, 512MB of RAM and dual Gigabit Ethernet ports, with Windows Storage Server 2003 in the driving seat.

The triplet of 164GB SATA drives is mounted in removable carriers, but only cold-swap is supported, as all RAID functions are managed by the OS. The unit comes preconfigured as an 8GB RAID-1 mirror for the OS, with the remaining space set up as RAID-5 array.

Installation is helped along by Iomega's Discovery utility, which lists all discovered appliances and enables you

to modify their IP addresses. Good client support and plenty of security features are provided, and you also get the file-screening feature for filtering what files can be copied to the appliance, and directory level quotas for more precise control of storage usage.

You also get real-time and on-demand virus scanning with Computer Associates eTrust AntiVirus, and the price includes daily virus signature updates. A single-channel SCSI controller is provided for connecting



external tape drives for local back-up and Iomega also bundles its Automatic Backup software.

The NAS 200d looks good, offers a generous range of features and is more appealing than the SilverSTOR 500Q as a general purpose NAS appliance.

TIKO Classic 340

INFORMATION

PRICE £2,056 (£1,750 ex VAT)
DELIVERY Free
SUPPLIER Unique Supplies
 0800 11 1111
INFO www.wisemouse.com
WARRANTY Three years return to base

SPECIFICATION

TYPE Network Attached Storage (NAS)
CPU 2.8GHz Intel Pentium 4
CAPACITY 1TB
OS Windows Storage Server 2003

PCPlus ratings

TIKO CLASSIC 340

Value ●●●●●●●●●●

Features ●●●●●●●●●●

Performance ●●●●●●●●●●

OVERALL 8

While many vendors are settling on Windows Storage Server 2003 to power their NAS appliances, the Classic 340 uses a Linux kernel streamlined to fit on a low-cost 64MB IDE Flash memory module. Along with reduced costs, this enables all the 1TB of hard disk-based storage to be used for sharing over the network.

This 1U rack chassis is an all-Supermicro package equipped with a 2.8GHz Pentium 4 and 512MB of PC200 SDRAM. The four hard disks are mounted in hot-swap carriers and the interfaces are managed by an embedded SATA controller. The OS looks after all RAID functions and supports -0, -1 and -5 arrays. Internally, the 340 is tidily designed but noise levels are far too loud for a small office environment.

Installation is swift and the browser interface is easy enough to use. Windows, Unix, Linux and Macintosh clients are supported, and security extends to standard users, group membership and ACLs (access control lists), while disk quotas enable storage usage to be strictly controlled.

As the motherboard has a spare PCI slot, you can add a tape drive for local back-up, though the features on offer are limited. Full and incremental back-ups of folders can be secured to the tape drive, but a lack of scheduler makes this of limited value. The



appliance also supports iSCSI as standard, but only to the extent that designated volumes can be exported as a target device.

Small businesses will find the Classic 340 expensive, yet it competes well on price and features against similar rack mount NAS appliances. It's well suited to larger networks.

NAS performance – the network connection

Why wait for slow file delivery when there are more viable alternatives?

It doesn't matter how fast the hard disks in your NAS appliance are, as performance is going to be determined primarily by one component: the speed of its network adaptor. Heavy file sharing activity over a network can generate a lot of traffic to and from the appliance, so it's important to place it on the fastest link possible. In terms of productivity, it's all about reducing the time spent waiting for data and applications. File sizes have increased exponentially over the past few years, so why make users wait unnecessarily for slow file delivery?

For light usage, you can probably get away with a Fast Ethernet connection, but with most appliances now coming as standard with support for Gigabit Ethernet, it makes sense to use this instead. Adding Gigabit Ethernet isn't as expensive

as you may think, as many switch vendors have been busy reducing prices to enable it to be pushed out to the network edge and down to the desktop. The Corega GSW-24 switch (PC plus 224), for example, provides a full complement of 24 Gigabit ports for about £500. A single Gigabit connection can deliver a maximum speed of 125MB/s, but if you want more, you should look at appliances such as Iomega's NAS 200d, which has a pair of high-speed ports. Provided that both ports are connected to a switch, you can use the Windows OS and a utility supplied by the card vendor to amalgamate them both into a single high-speed link that doubles throughput.

A more cost-effective alternative is to use a Fast Ethernet switch with Gigabit uplink ports. Netgear's FS526T Smart Switch (PC Plus 213) provides 24 dual-speed ports and a pair of copper Gigabit uplinks all for less than £300. At the time of writing, Netgear was also offering pairs of free Gigabit network cards with the switch as well. ■



This month's contenders up

DETAILS Magnetic

Manufacturer	SmartDisk	Iomega	LaCie	Fujitsu
Model	Crossfire XF 160	HDD DHD250-U	d2 Big Disk	Handy Drive Data Edition
Info URL	www.smartdisk.com	www.iomega.co.uk	www.lacie.co.uk	www.fujitsu.com
Sales Number	020 8994 5577	Web only	0870 027 0900	Web only
Price (and ex VAT)	£96 (£82 ex VAT)	£111 (£94 ex VAT)	£241 (£205 ex VAT)	£89 (£76 ex VAT)
Warranty	Two years	Two years	Two years	Two years

SPECIFICATIONS

Capacity (GB)	160	250	400	60
Cost per GB (£)	£0.60	£0.45	£0.60	£1.49
Interface	USB 2.0, 2x FireWire 400	USB 2.0	USB 2.0, FireWire 400, 2x FireWire 800	USB 2.0
Buffer (MB)	2	8	2	2
Rotational Speed (rpm)	7200	7200	7200	4200
Dimensions (HxWxD) (mm)	40x127x224	39x121x193	44x172x271	9x73x132
Weight (grams)	865	855	2,475	185

TESTS

Random Access Time (USB, F/Wire400, F/Wire800) (ms)	12.9, 12.8, n/a	16.8, n/a, n/a	14.1, 13.8, 14.1	20.0, n/a, n/a
CPU Utilisation (USB, F/Wire400, F/Wire800)	2%, 2%, n/a	0%, n/a, n/a	10%, 0%, 2%	7%, n/a, n/a
Average Read Speed (USB, F/Wire400, F/Wire800) (MB/s)	46.4, 36.8, n/a	21.0, n/a, n/a	196, 331, 43.5	13.7, n/a, n/a
Average Write Speed (USB, F/Wire400, F/Wire800) (MB/s)	191, 31.7, n/a	190, n/a, n/a	18.8, 296, 48.2	12.8, n/a, n/a
Burst Speed (MB/s)	95.4, 42.3, n/a	21.2, n/a, n/a	21.4, 39.7, 64.7	13.9, n/a, n/a
Real-World Write Speed (MB/s)	2.78	6.25	5.56	1.34

PCPlus verdict 8

PCPlus verdict 8

PCPlus verdict 9

PCPlus verdict 7

DETAILS Optical

Manufacturer	Iomega	BenQ	MSI	LG
Model	Super DVD Writer 16x	EW1621	DRE8	GSA-5163D
Info URL	www.iomega.co.uk	www.benq.co.uk	www.msicomputer.co.uk	www.lge.co.uk
Sales Number	Web only	020 8994 5577	0870 787 0410	0870 112 0912
Price (and ex VAT)	£80 (£68 ex VAT)	£125 (£106 ex VAT)	£75 (£64 ex VAT)	£99 (£84 ex VAT)
Warranty	Two years	One year	One year	One year

SPECIFICATIONS

Buffer	3MB	2MB	2MB	2MB
Dimensions (HxWxD) (mm)	62x160x243	53x154x231	57x166x236	54x163x244
Weight (grams)	1,445	1,355	1,435	1,470

MANUFACTURERS' RATED SPEEDS

Read (CD-R, DVD-ROM)	40, 16	40, 16	40, 16	40, 16
Write (CD-R, CD-RW)	40, 24	40, 24	40, 24	40, 24
Write (DVD-R, DVD-RW)	8, 4	16, 4	8, 4	16, 6
Write (DVD+R, DVD+RW, DVD+R DL)	16, 4, 2.4	16, 4, 2.4	8, 4, n/a	16, 8, 4

RESULTS

Read (CD-R, DVD-ROM)	02:20, 15:34	02:40, 15:56	02:43, 16:06	02:40, 15:34
Write (CD-R, CD-RW)	02:37, 05:28	03:21, 03:59	02:56, 05:32	03:14, 03:58
Write (DVD-R, DVD-RW)	09:27, 30:02	08:38, 25:45	11:23, 29:15	07:51, 29:10
Write (DVD+R, DVD+RW, DVD+R DL, DVD+R DL)	07:16, 14:25, n/a, 43:46	07:33, 14:46, n/a, 46:09	10:15, 14:45, n/a, n/a	05:29, 15:01, n/a, 26:47
Real-World Write Speed (MB/s)	3.13	3.45	1.96	3.03

PCPlus verdict 8

PCPlus verdict 8

PCPlus verdict 7

PCPlus verdict 9



Buffalo

DriveStation

www.buffalotech.co.uk

Web only

£73 (£62 ex VAT)

Two years

80

£0.92

USB 2.0

2

7,200

173x54x164

1,120

14.5, n/a, n/a

8%, n/a, n/a

173, n/a, n/a

16.7, n/a, n/a

20.2, n/a, n/a

1.2

PCPlus verdict 7



Plextor

PX-716UF

www.plextor.co.uk

Web only

£138 (£117 ex VAT)

Two years

8MB

54x184x266

1,600

48, 16

16, 4

16, 8, 4

02:36, 29:20

02:42, 03:48

08:20, 28:34

06:47, 14:58, n/a, 18:38

2.7

PCPlus verdict 9

DETAILS Flash

Manufacturer	Iomega	MSI	Imation	Sandisk	PNY	PNY
Model	Micro Mini	Mega Cache 15	HMDS-128C	Cruzer Titanium SDCZ3-512	Attaché 1GB	Evolution Attaché
Info URL	www.iomega.co.uk	www.msicomputer.co.uk	www.imation.com	www.sandisk.co.uk	www.pny.co.uk	www.pny.co.uk
Sales Number	Web only	0870 755 4747	Web only	0870 055 5552	Web only	Web only
Price (and ex VAT)	£52 (£44 ex VAT)	£53 (£45 ex VAT)	£15 (£13 ex VAT)	£50 (£43 ex VAT)	£53 (£45 ex VAT)	£14 (£12 ex VAT)
Warranty	Two years	One year	Two years	Five years	Two years	Two years

SPECIFICATIONS

Capacity (MB)	512	1,536	128	512	1,024	128
Windows Formatted Capacity (MB)	495	1,360	124	498	983	119
Cost per MB (£)	£0.10	£0.03	£0.12	£0.01	£0.05	£0.11
Dimensions (HxWxD) (mm)	9x17x44	12x56x70	10x16x55	7x21x75	10x19x79	15x45x77
Weight (grams)	10	55	10	20	15	25

TESTS USB

Random Access Time (ms)	0.9	33.2	1	1.3	6.3	1
CPU Utilisation	0%	4%	8%	10%	8%	6%
Average Read Speed	8.5	4.5	76	14.8	10	71
Average Write Speed	10.8	4.6	74	14.1	4.6	1.7
Burst Speed (MB/s)	11.8	5.7	78	15.9	10.4	173
Real-World Write Speed (MB/s)	0.13	0.1	0.06	0.13	0.25	0.06

PCPlus verdict results >>>

PCPlus 9

PCPlus 8

PCPlus 9

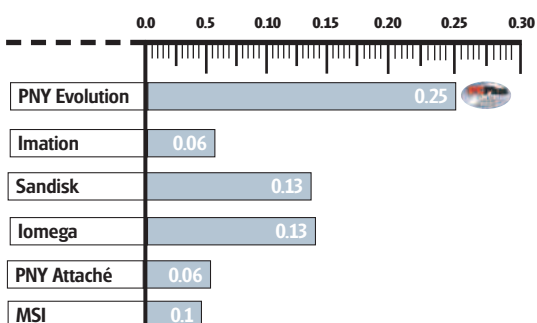
PCPlus 8

PCPlus 9

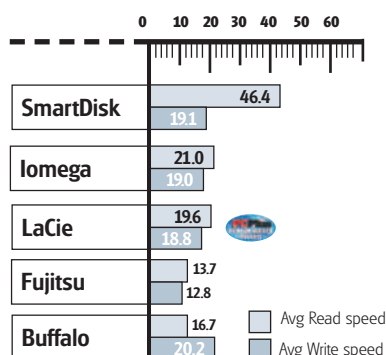
PCPlus 8

Performance test results Bigger is better in all tests

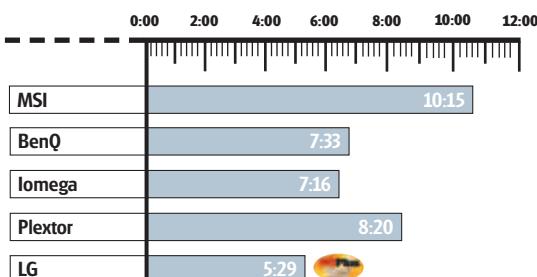
Flash real-world write speeds (MB/s)



Magnetic real-world test



Optical write speeds



Real-world test

HD Tach and Nero Speed Test are superb benchmarks for assessing the speed of a drive under test conditions, but we want to find out how well these drives cope with real-life situations. We've compiled 100MB of small files, which we copy to and from each of the drives in our round-up: CD/DVD drives, hard disk drives, flash drives and all. We time the transfer, recording the times in our results tables. The lower the transfer time, the faster the drive. ■

PCPlus Verdict

We had twenty external storage devices to scrutinise, but only three wound up being winners



EDITOR'S CHOICE

LG GSA-5163D

PRICE £99 (£84 ex VAT)

SUPPLIER www.novatech.co.uk

INFO www.lge.co.uk

The LG GSA-5163D comes highly recommended. Just look at the factors in its favour: it supports all three major writable DVD formats and dual-layer writing, and is the only drive on test to offer DVD-RAM support. What's more, it does all this at a very high degree of consistency, reliability and raw speed. Its real-world write test performance and reliability in our testing process are the real show-stoppers. Then there's the price: at under £100, this is an absolute bargain, especially when taken in light of its versatility



and comprehensive format support. We suggest that anyone specifically interested in DVD writing should seriously look at LG's internal models. We found a similarly specified OEM drive (the LG GSA4163) on www.ebuyer.com for just £38 (inc VAT). Not only is this an even greater saving, but it also avoids the performance limitations placed on the hardware by the use of USB or FireWire connectivity.

PCPlus verdict 1 2 3 4 5 6 7 8 9 10

ANALYSIS

Think price-per-Megabyte

With so many excellent products and so many factors to consider, deciding on awards is never an easy process, and this month's external storage Group Test has been no exception. Here's an outline of the factors that influenced our final decisions:

Magnetic Devices

It's difficult to imagine exactly how most people would fill a 400GB hard disk, but this is what external hard disk storage is all about: capacity. While LaCie's Big Disk is recommended on the strength of its comprehensive package as well as its enormous capacity, the latter is what most users will be concerned with. At 60p a gigabyte, it shows how large drives offer great value for money.

Optical Devices

This is the category where there are perhaps the most things to consider, but also the one that's the most clear-cut. Support of -R, +R, DVD-RAM and dual-layer recording is the first thing, but then you have to factor in CD writing, performance levels, reliability, portability and price. To this end, it's no surprise to see that the best drives have the best speeds across the widest range of formats and variations. Having all of the options out-of-the-box in one drive really is quite satisfying.

Flash Memory Devices

Given the nature of these drives and their intended uses, the most important considerations to take into account are portability, capacity and price. There aren't massive variations in performance across this range of products, so marking a particular one out from so many choices isn't easy. The PNY Attaché is a great example: it's small and portable, and its 1GB capacity is large enough to negate the need for a CD burner for transferring files. Although it's by no means the cheapest of its kind, it nevertheless does its job superbly well and represents a sound investment in portable storage technology.



BEST VALUE

PNY Attaché 1 GB

PRICE £53 (£45 ex VAT)

SUPPLIER www.ebuyer.com

INFO www.pny.co.uk

Being generally the cheapest of the three different kinds of storage on test, the value award just had to go to a Flash memory device. Although the Mega Cache does have a larger capacity, it loses a lot in the formatting process. More to the point, 1GB is just about the ideal size for a thumb drive. Its real-world test result was nothing short of exceptional, and while its other performance levels weren't up to this standard, they were still respectable. The Attaché is also a more portable product than the Mega Cache.

PCPlus verdict 1 2 3 4 5 6 7 8 9 10



BEST PERFORMER

LaCie d2 Big Disk

PRICE £241 (£205 ex VAT)

SUPPLIER www.savastore.com

INFO www.lacie.co.uk

Although there wasn't much in it between LaCie's d2 Big Disk and the SmartDisk Crossfire, the LaCie won us over. The deciding factor was the performance of the Big Disk in our centrepiece real-world write test. It took just 18 seconds to write 100MB of files, which works out at 5.56MB/s, and is nearly twice as quick as the Crossfire. Otherwise, it performed consistently across the board in all other tests. Any mention of this drive must include reference to its size. With 400GB of space at your disposal, it will take quite some time to fill up.

PCPlus verdict 1 2 3 4 5 6 7 8 9 10

PCPlus

ONLINE SECURITY

→ Online hardware and software security

**Simon Williams**

simon.williams@futurenet.co.uk

Simon has been an IT journalist for the last 20 years, and has spent half of that time dissecting computers, peripherals and the software they run

safety in numbers

Internet security is more than scanning for viruses.
We explain the ramifications of attaching a PC to the Net

TAKE THE SECURITY SELF-TEST

While you probably don't want to download viruses to test your copy of Norton (and yes, it is 'viruses', not 'virii'), there are sites on the net capable of checking your defences against other forms of attack. One of the best known is Shields Up!, accessed at www.grc.com. This probes your machine, attempting to find any open/unstealthed ports, trying to send you a message via Messenger spamming techniques, and making sure that your machine isn't running as an internet server without your knowledge. It's an excellent, free way of seeing exactly what kind of dangers you may be inadvertently exposing yourself to every time you go online.

It's hard to remain unaware of the threat from computer viruses for anybody using a PC. The media, in all its forms, is only too happy to focus on the sensationalist aspects of this form of malware. However, these programs remain a problem by destroying files on your computer or shutting it down or displaying unwanted messages.

However, they're not the only thing you need to protect yourself from when using a PC attached to permanently on Internet connection. Easily as worrying are programs which scan your PC for personal details, such as credit card numbers or passwords: identity theft is a rising crime, netting an estimated £1.3bn last year.

And then there are botnets, where your PC is hijacked using a 'worm' program, to form part of an illicit gang of computers – a robot network – used to deny service from targeted →



Value Award

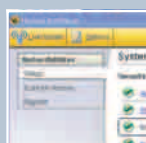
Awarded to products that represent outstanding value for money, giving you more bangs per buck



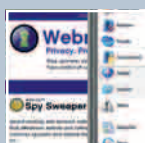
Performance Award

Awarded to products that excel in our performance and quality tests, where money is less important

Contents

**Norton
AntiVirus 2005**

84

**Webroot
SpySweeper 3.5**

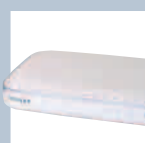
85

**Zone Alarm
Pro 5.5**

86

**US Robotics
USR200**

88

**Netgear DG834**

89



Putting hardware firewalls through their paces is an ongoing task, as new threats emerge virtually every week.

How we test

We had several different types of hardware and software to test in this Labs Focus: antivirus programs, anti-spyware and firewalls in software and hardware. We access websites we know harbour worms and check if these were detected and how they are handled. We also use test software to see if our firewalled systems are visible from the Internet.

In many ways, the best security programs are the ones you hear least from. You want them to report when they've had to do something to protect your data – particularly if they haven't been able to cure the problem outright – but otherwise you want them to sit in the background and not get in anyone's way.

We, therefore, look at how many warnings and reports the software give and if any of these are, if not false positives, pretty trivial. We look to see if firewall software recognise commonly used applications, such as Microsoft Office or Adobe Acrobat, and configure themselves correctly when these applications tried to make periodic access to the Internet. We also assess how these security programs, and their hardware counterparts, handle applications which upgrade themselves online.

Additionally, we assess different security settings in the software firewalls are looked at to see how appropriate they are for what they say they are protecting. Are the low, medium and high settings, or whatever the software writers choose to call them, really that?

Finally, we check whether routers with integral firewalls rely on NAT or supplement it with other protective regimes. How easy is it to set-up the protection in each router and are the default settings reasonable for those who just want to plug and go – do you have to run a set-up utility, or is a web browser all you need? ■

Internet websites. You're unlikely to know your PC is being used in this way, but someone is pillooning the processing power of your computer to damage the reputation or sometimes the livelihood of other Internet users.

There are three fundamental threats to your PC: viruses, spyware and worms. You can protect against them with antivirus, anti-spyware and firewall devices, respectively. We say 'devices' deliberately and include in this term both hardware and software. Viruses are normally handled through software and counteracting spyware is normally the work of specialist programs, too. Firewalls can be either software or hardware-based. Although the two types work in slightly different ways, their primary objective is to stop communication with other computers, and hence other people you don't know and don't want to know. Here we'll break down each of the major security issues you should be addressing when connecting a PC to the Internet, whether it's your home machine or part of a multi-PC network in an office.

Virus precautions

It's difficult to understand the mind of a person who writes computer viruses. You might understand the intellectual challenge of trying to write

a piece of software, which can worm its way onto somebody else's PC without detection. There's a strong element of puzzle solving and 'beating the system' in this kind of coding. However, it's much harder to understand the desire to destroy data or pull down the systems of people you've never met and who have certainly done you no harm.

Whatever the motivation, viruses certainly exist, are getting smarter in the way they work, and are constantly being countered by equally smart antivirus software. As each new virus gets stealthier, so the antivirus programs try to keep one step behind. Yes, we did say behind. Remember, most antivirus is updated in response to new threats. While heuristic programs try to spot new virus activity by looking at how all viruses work it's often only possible to counter a virus by writing a specific detection program.

One of the measures of a good antivirus product is the speed with which the supporting laboratory can provide virus definitions, to detect and defeat a new virus: the typical turnaround is measured in a few days from the start of an outbreak.

Viruses: how they work

Viruses get onto your PC masquerading as attachments to emails or as hidden code on a

SOFTWARE FIREWALL

NORTON ANTIVIRUS 2005



Norton AntiVirus 2005 is still the best-known antivirus application in the country, and does a good job, though it can hit the performance of your PC.

Norton AntiVirus is the market leading antivirus program, having built up a reputation over a number of years as a solid, well supported security tool. The program you install is only one part of the package, as it has a very close relationship with the virus definitions and continuous upgrades offered by its supporting website.

New features of the 2005 version include Internet Worm Protection and QuickScan. While protection against Internet worms, which can

invade your PC to harness it for DDoS attacks, is a positive move, Norton's status screen suggests it's only guarding against just three of these miscreant programs. QuickScan, as its name suggests, scans the whole of your system for new viruses, each time it downloads a virus definition update. This is a logical extension of the cover that's already provided for you.

The Norton AntiVirus interface is easy to work with and includes access to a virus encyclopaedia, so you can determine how dangerous a particular virus is, should you be attacked. If a virus is detected, the program normally deals with it automatically, informing you afterwards that it has quarantined or deleted the offending code.

Although, at £20, Norton AntiVirus is not expensive, this is the basic package which doesn't include a software firewall or anti-spam or anti-spyware components. For that you need Norton Internet Security, which is priced closer to £60.

It's not all perfect, either, as Norton AntiVirus 2005, (like its predecessors) makes comparatively heavy use of resources. If you have a new, high clock-rate machine this needn't be a problem, but running it on something older, you may suffer a noticeable performance hit. It doesn't have to be this way, as other products, such as Trend Micro's PC-cillin Internet Security 12 (www.trendmicro.co.uk), are much less resource-hungry.

If money's tight, there's a free source of antivirus protection in the form of AVG Anti-Virus, which can be downloaded from www.grisoft.com. While several antivirus companies offer trial versions of their programs, the unique thing about AVG is that both the software and virus definition updates are free for personal use. ■

INFORMATION

PRICE £20 (£17 ex VAT)

SUPPLIER www.softwarecellar.co.uk
0870 235 1822

INFO www.symantec.com/region/reg_eu

PCPlus ratings

NORTON ANTIIVRUS 2005

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●

OVERALL 8

website, which is executed when you visit it. You normally have to run the file explicitly for the virus to do its work, but it's relatively easy to persuade people to open an attachment. As well as the usual temptations of money or sex, recent viruses have tied themselves into major events, such as 9/11 and the Indian Ocean Tsunami.

Once run, a virus will usually make changes to your system and try preserving itself by making copies under other names in different folders. It may even try to disable any antivirus software you have installed.

Modern viruses usually try to propagate themselves, also, by sending copies of themselves to some or all of the contacts in your address book. They do this by sending multiple messages, often with enticing names and sometimes using your name and email address as the source.

As well as the harm it might do to your own PC, if it propagates itself from your machine using the names in your address book and can very easily give you a bad name. At the

up to date by paying a subscription to download new virus definitions. Regardless, though, there are three ways of defeating a virus. You can prevent it being downloaded onto your PC; you can quarantine or delete the file that contains it and undo any changes it may have made to your system; and you can stop it proliferating by preventing it sending automated emails. Most modern antivirus software attempts to cover all three bases.

Typical antivirus programs sit on your system and monitor all incoming email, checking for suspect code in attachments, even if they are compressed into ZIP, RAR or other archive files. Most delete or quarantine suspect files automatically. This is the safest way to deal with a virus, as it never gets the chance to infect your PC.

When an antivirus program quarantines a suspect file, it stops any part of the Windows system from accessing it and prevents the program running as well. Rather than just going straight in to delete the file, this approach enables you to

continue running Windows, in case you have to take further action to safely remove the virus code. If the file that's infected is an integral part of Windows, deleting it could crash your system.

The second approach is to defeat the virus once it's already on your system. This is done by scanning all executable files at regular intervals. Most antivirus programs automatically schedule this type of scan, at least once a week. It's best to pick a time when you're unlikely to be working on your PC, as a full antivirus scan takes a while and slows your computer while it's running.

Finally, antivirus will typically monitor emails leaving your PC



"While heuristic programs try to spot new virus activity, it's often only possible to counter a virus by writing a specific detection program."

very least your contacts will think you're taking insufficient care.

Viruses: how to fight back

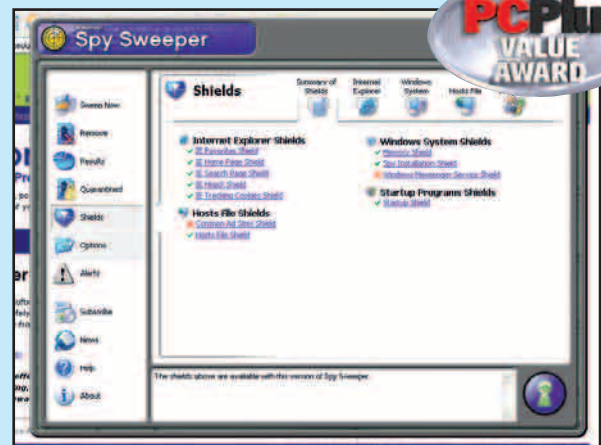
Several commentators have noted that the virus threat, which is essentially a continuing one as new viruses are released, provides an almost ideal marketing model for antivirus software. Because the antivirus software has to be modified to cope with new threats, it's essential not just to install it, but also to keep it



What a generous gesture on AVG's part to provide a free antivirus program, with updates, for personal use. No excuse for catching a virus now.

SOFTWARE ANTI-SPYWARE

WEBROOT SpySweeper 3.5



Spy Sweeper was one of the first specific anti-spyware programs to be launched and is still at the head of the field.

Unlike antivirus software, the main players in the anti-spyware market are not the usual big names. Although companies like Symantec (Norton) and McAfee produce anti-spyware products, they aren't as effective in rooting out spyware and adware in our tests as some of their smaller competitors. It's these products, which have developed a name for themselves through the Internet's equivalent of word of mouth.

Things may change when Microsoft releases the final version of its own anti-spyware software. Microsoft AntiSpyware is currently in beta and available free from www.microsoft.com/athome/security/spyware/software/default.msp. The program offers real-time protection as well as a pretty thorough scanner, which picked up some malware on our test PC that wasn't spotted by other commercial products like XoftSpy.

Spy Sweeper 3.5 is a comprehensive anti-spyware product, which includes both a scheduled scan and a selection of shields which prevent actions which could install spyware, mostly within Internet Explorer. Now in version 3.5, the program can be downloaded for a free 30-day trial and is then around £16 for a year's subscription.

The program is logically designed and easy to use. You can force a scan at any time or use the built-in scheduler to perform one at a convenient time, such as in the middle of the night. You can also select from a variety of configuration options, which will define exactly what shields you want in place and how you want spyware handled when detected.

When Spy Sweeper discovers spyware, it reports it to you and offers you a brief description of the program, together with a severity analysis, so you can decide what to do. This is useful as, for example, you may be happy to accept passive cookies on your system, but will want to take action against more intrusive code.

The program spotted all our test spyware and a full scan completed in just 2 minutes 16 seconds. This is comparatively quick, with many other programs taking twice as long. With Spy Sweeper 3.5 you have a product which manages to spot all the spyware, that we can throw at it at least, and is easy to set up and use. It's also extremely quick in its execution and for under £20, is a bargain. Unless the full version of Microsoft AntiSpyware continues to be free, Spy Sweeper has to be one of the best deals on the block. ■

INFORMATION

PRICE £16

SUPPLIER www.webroot.com, download only

INFO www.webroot.com

PCPlus ratings

WEBROOT SPYSWEEPER 3.5

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
OVERALL	9

SOFTWARE FIREWALL

ZONE LABS **Zone Alarm Pro 5.5**

ZoneAlarm manages to combine a high-strength software firewall with excellent ease of use. You don't have to be a sysop to install and run it.

There are plenty of software firewalls available, both as standalone products and as part of security suites. Most of the big names in security are represented, with products from Symantec, McAfee and Computer Associates alongside newer companies like BlackICE and Zone Labs. Paradoxically, the younger companies are often those that started life with firewall products.

Zone Labs' core product is the ZoneAlarm firewall, with a basic version available for free from the Zone Labs site at www.zonelabs.com. This provides an industrial strength software firewall, more effective than the one bundled as part of Windows XP, but without all the bells and whistles of the full ZoneAlarm Pro. For personal use, on a home PC, the basic Zone Alarm may be all you need to protect yourself from unwanted intrusions.

The commercial program, Zone Alarm Pro, shares the basic version's easy to use interface and set-up. It detects internal networks as well as the Internet and you can set the security levels for each with simple sliders.

Each time an application tries to connect to the Internet, Zone Alarm Pro pops up an alert, but unlike similar software, it offers advice on whether you should allow the application to proceed. It also remembers the action it has taken and repeats it if the application tries again.

The program monitors outward emails as well as inward bound ones, so preventing the distribution of viruses that auto-send from your contacts list. While not the only firewall to do this, it doesn't generate some of the false positives prevalent when using other with programs such as McAfee Firewall Plus.

There's at least one filler in the feature set, though, innocuously named Antivirus Monitoring. It's easy to see why Zone Labs would want to get the words antivirus into its software, but simply having a utility which checks if your virus definitions and program updates are up-to-date hardly qualifies itself for the right to use the word. This is particularly true since Windows XP SP2 does the same thing, and presumably your antivirus software itself does so too.

Zone Alarm Pro is one of the most secure software firewalls available on the market. With its flexible configuration options and an outstanding good value price, it's easy to recommend as part of your security arsenal. ■

INFORMATION

PRICE £26
SUPPLIER www.zonelabs.com,
 download only
INFO www.zonelabs.com

PC Plus ratings

ZONE LABS
ZONE ALARM PRO 5.5

Value ●●●●●●●●●●
 Features ●●●●●●●●●●
 Performance ●●●●●●●●●●

OVERALL

9

and spot repeated messages with similar content. If a virus tries to send messages to people on your contact list, usually only the destination name and address changes. By denying permission to your email client to send these similar messages, you can prevent the virus from spreading from your machine to possibly hundreds of others.

It's hard to overstress how important it is to run antivirus software. Even with ongoing subscription costs, you're only looking at an annual figure of £20 to £30. Some anti-virus packages are even free for personal use and are ideal for the home environment.

Counter-espionage

Adware and spyware are two categories of the same problem: malware. In both cases, the software installs itself on your PC and runs with the interest of a third-party squarely in mind. This type of program is designed to monitor the things you do on your PC: the websites you visit, the things you buy, even the keys you press. The only real difference between types of malware are their purpose.

The less malicious of the two, but probably the more superficially irritating is adware. This software is designed to monitor what you're doing and to gear pop-up advertising to your particular interests, the theory being that targeted advertising is more likely to result in sales.

The theory seems heavily flawed, however, as for the average user advertisements that pop-up during other work are a large source of intense annoyance.

Spyware, in contrast, looks at both the things you do and the things you store. At its simplest, the humble 'cookie' can be considered a piece of spyware, as they are held on your PC and read by websites each time you visit them. They can be completely harmless, holding simple details, like your membership number to a particular site, so that you can login automatically. They can also hold a lot of other information, however, which you may not want to hand over to an Internet site, whether you like the site or not.

More malicious spyware looks for passwords, credit card numbers and other details held on your PC. Although these details are often encrypted, the rapid increase in identity fraud has demonstrated that this isn't perfect protection.

This kind of spyware can also be used to recruit your PC as part of an anonymous network of computers, which can be harnessed via their spyware programs for malicious activities. Networks of 'zombie'



The Windows XP Firewall bundled with Service Pack 2 is better than previous incarnations, but it still can't compete with dedicated packages.

computers, gathered together in this way, can be used to generate Distributed Denial of Service (DDoS) attacks on legitimate Internet sites.

These botnets, which may number hundreds or even thousands of innocent PCs, do the work of their spyware masters on command and you may still be running your day-to-day applications while they're doing so. The only way you'll know is by a poorer response time from your PC.

Spyware has several side-effects as well. It will make your PC run considerably slower than before and could well make it less stable. Because there's independent software working inside your PC monitoring what you're doing as other programs are running, it can cause system crashes.

Also, this suggests that spyware is not as well-written as other programs. Since it relies on stealth and not being detected by people using the PCs on which it's running, you'd think its authors would work harder to ensure that it didn't put a significant extra burden on those systems. Recent statistics from Dell suggest that up to 20 per cent of its technical support calls can be attributed to spyware problems.

The National Cyber Security Alliance in the US estimates that up to 80 per cent of all home PCs are infected with spyware. The situation in the UK is known to be at least as bad. Here, it's partly because of the



A good hardware firewall, like this Linksys device, can prevent your PC or network being forced to take part in a DDoS attack.

rapid adoption of always-on broadband services, but also because very few people are aware of the damage spyware can inflict.

So how does it get onto your PC in the first place? It can travel down to you, 'piggybacking' on a legitimate piece of software which you have chosen to download. It can also be run by you accepting the installation of something like a dialler for a specialist Internet service or it can enter your PC in the same way a virus does, as an attachment to what appears to be a legitimate email.

Because most spyware works in conjunction with software on a website, the initial 'seed' of a program doesn't have to be very big. Once installed, the seed can download extra code in the background and you'll be none the

Adware and Spyware can be detected in much the same way as viruses, by looking for code 'footprints'. Many different anti-spyware applications are available, ranging from programs which perform scans on demand, to spot any suspect code, to those which run continuously in the background, looking for unwanted code as you work with your emails and web visits.

As you will find with antivirus software, you can download free anti-spyware utilities to provide basic cover, or put your hand in your pocket and buy commercial products with more sophisticated feature sets, if you discover that your PC is under more sustained attack. Most Internet security suites now include some form of spyware protection among their various modules.

traffic from the Internet, you can prevent a lot of malicious attacks, particularly those aimed at hijacking your PC.

Any PC has a number of virtual connections to the Internet known as ports and different ones are legitimately opened for different purposes. There are over 65,000 ports available, so keeping track of them is no mean feat. Any port that's open can be detected using scanner software, very popular with hackers. If a scanner finds an open port, it can potentially send malware through the port into your PC. This could be to steal your sensitive information, such as passwords and bank account details, or to recruit your PC as part of a botnet.

With a suitable firewall, you can stipulate not only which ports are open, but which software is entitled to make contact with the Internet and which sites you're willing to accept data from.

"The National Cyber Security Alliance in the US estimates that up to 80 per cent of all home PCs are infected with spyware."

wiser. Even if you delete the extra code using a security tool, that tool needs to hunt out and delete the seed, too, or the spyware will simply reinstate itself.

IE, IE, Oh!

Until recently, one of the easiest ways spyware could enter your PC was through one of the many security vulnerabilities of Internet Explorer (IE). Because so many people use IE and because in some respects it's not that well-designed, it became a favourite target for malware authors to exploit holes in its security to their own ends.

The most recent version of Internet Explorer, with Service Pack 2, is a lot more secure than earlier ones and an important step towards increasing your overall PC security is to upgrade to this version. It's compatible with versions of Windows back to Windows 98. Once you have the latest version, it's important to keep it up to date by downloading fresh updates as they appear.

Border guards

The third form of protection against attack is a firewall. A firewall is simply a piece of software or hardware that controls the connections that are permitted between your PC and the outside world. By governing inbound

Hardware or software?

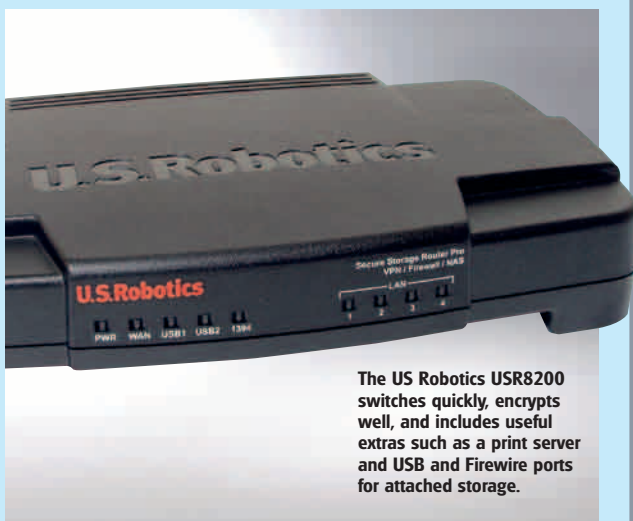
If you can create a firewall with either hardware or software, which is the better option and why are there two? They perform subtly different jobs and it's quite reasonable to use both to protect the same PC. They work together and you won't experience clashes having a software firewall on each PC and a



It may still be in beta, but Microsoft's AntiSpyware software is based on a mature core developed by Giant Software. It's already been the focus of attack, though.

HARDWARE FIREWALL

US ROBOTICS USR8200



The US Robotics USR8200 switches quickly, encrypts well, and includes useful extras such as a print server and USB and Firewire ports for attached storage.

If you're after a hardware firewall, specifically one which can be used with a VPN (see 'VPN security' across the page), so you can telework securely onto a private network, US Robotics' USR8200 has a lot going for it.

In some ways it's a matter of what emphasis you prefer that will dictate whether you buy a router with a built-in firewall or a hardware firewall, which also routes traffic to machines on an intranet. This is definitely a firewall which is also a router, having four network ports at the rear. Among the many acronyms it supports are SPI, DMZ host support, application level gateways, 3DES hardware encryption for VPN sessions and protection against DDoS attacks.

Installation is made particularly simple by the adoption of an IP address of <http://usr8200>, rather than some arcane 32-bit code. It's then just a question of running through the well laid-out setup screens to configure the firewall as you want it. Intelligently, US Robotics forces you to set an administrator password, so this should help protect the device itself from hacking.

Most settings are sensible, but the default 'Maximum' security may be a bit too constraining and the 'Typical' setting is probably nearer to your needs. The 'Minimum' setting is misnamed, as it lets traffic through in both directions: 'None' would be a much more accurate description.

While the company was designing the USR8200, US Robotics decided to build in a number of other goodies. There's a single Firewire and twin USB ports at the back so you can connect fast hard drives for Network Attached Storage (NAS) or a USB printer, which will provide you with a network printer, without having to pay out for a separate server.

The only thing we can really hold up as a negative mark against this firewall is its external power supply: it's unfortunate to have yet another cable sticking out the back. The manual is a bit on the slim side, while still also covering installation in six languages. That said, set-up is so easy that it's probably unfair to suggest the kit needs any more instruction than this.

You can get a router with a firewall for around £70, but this box does offer valuable extras on both the security front and in its feature set. It's worth its asking price and the peace of mind it provides. ■

INFORMATION

PRICE £204 (£174 ex VAT)
SUPPLIER www.bargainbuys365.co.uk,
INFO www.usr.com
WARRANTY 2 years back to dealer

PCPlus ratings

US ROBOTICS USR8200

Value ●●●●●●●●●●
 Features ●●●●●●●●●●
 Performance ●●●●●●●●●●

OVERALL

8

hardware firewall built into your broadband router.

The hardware firewall sits between your PC or network of PCs and your Internet connection. It uses a technique called 'packet filtering', which looks at the headers at the start of each packet of data to determine where they came from and where they're headed to.

It may support a more advanced form of this filtering called Stateful Packet Inspection (SPI), which looks at the headers in more detail and also determines whether data coming in is in direct response to that going out. Examples of this would be requesting a download from a website or engaging in a web chat through a messaging agent. If incoming traffic is not in response to outgoing, it's treated as more suspicious.

Most hardware firewalls concentrate on traffic coming into your PC or network and assume that outgoing traffic is legitimate. However, there are at least two specific instances where you need to check outgoing data as well.

The first is when a virus propagates itself by sending copies to everybody in your contact list. Sending out a virus to a friend or colleague, at the very least, makes you look unprofessional. If it's a particularly malicious example of the species, it could cause them considerable angst, too.

The second example is when your PC is hijacked and its controller tries to use it as part of a DDoS attack against a website. While it's hard for the site under attack to determine where the demand for data is coming from – so your PC is likely to remain anonymous – it's not good to think your computer is out of your control and being used to disable, even temporarily, a part of the Internet.

To counteract this kind of threat, you need a good software firewall. This will monitor applications and their use of data, rather than checking the data streams themselves. Most modern firewall programs include details of legitimate users of the Internet, for example, programs which automatically download updates.

They won't raise an eyebrow at Windows Update checking for the latest revision to Windows XP, but they will block any program they haven't been told about and ask for permission before letting it proceed. When you first install a software firewall, you get quite a few alerts, asking if specific programs should be allowed access.

The software firewall learns your settings quickly, though, and after a few days the vast majority of applications will be handled transparently. You can also set global security levels for your intranet and the Internet. You would typically have a lower security level between PCs

"A worrying statistic, published recently by Symantec, is that there are more PCs hijacked into botnets in the UK than any other country."

TECHNOLOGY

NAT works on networks

The main defence provided by using a router is Network Address Translation, or NAT, but this is an almost accidental bonus. The primary function of NAT isn't to provide a firewall and in the strict sense of the term, it isn't one. It's designed to reduce the number of network addresses needed on the Internet, by enabling a number of PCs in a network to share a single Internet address.

All Internet addresses are 32-bit numbers, such as 192.168.100.225, so there are only 4,294,967,296 that are theoretically possible. In fact, because some addresses are reserved for special uses, there are around 3.3 billion available. This might sound like a lot, but with nearly 400 million PCs on the Internet and the figure doubling

each year, the addresses need to be conserved. A new standard, called IPv6, could, in theory, provide billions more addresses, but it's likely take a while to implement and for countries to agree and adopt the standard, until then there's NAT.

NAT acts like an agent for the computers on your network, insisting everything intended for you goes through it first and treating your replies the same way. It just doesn't take 20 per cent on the side for its trouble.

Everything on the Internet side of a NAT device is said to be public, while the network on your side is private. NAT enables you to have a presence on the Internet with just one network address, while each PC in your home or business

on your internal network, as you may want to share files or other resources which would not be appropriate with remote PCs on the Internet.

You only need one hardware firewall to protect a whole network of computers, but software firewalls need to be fitted on every PC, which has access to the Internet. This isn't a reason to rely on just a hardware firewall, thus saving a few hundred pounds. You could lose a lot more than that if don't make sure your network is properly protected.

VPN security

If you want to be able to access your own network via the Internet, you need to set up a Virtual Private Network (VPN). It can obviously be very handy to be able to work with data remotely in this way, perhaps for teleworking from home or when on the road.

To ensure security, and make sure someone outside can't access your network, some hardware firewalls are now equipped to handle VPNs. This mainly means that data going in and out of a network for VPN use is encrypted and can't easily be read, if it's intercepted. Not all firewalls support the use of VPNs, so if you think you'll need this facility either now or in the future, make sure the hardware you're considering supports this.

Fitting any form of hardware security doesn't prevent illicit use of a VPN, if the human beings using it get careless with their passwords. Security is only as good as the weakest link in the chain and however formidable the data checking, if someone lets slip with

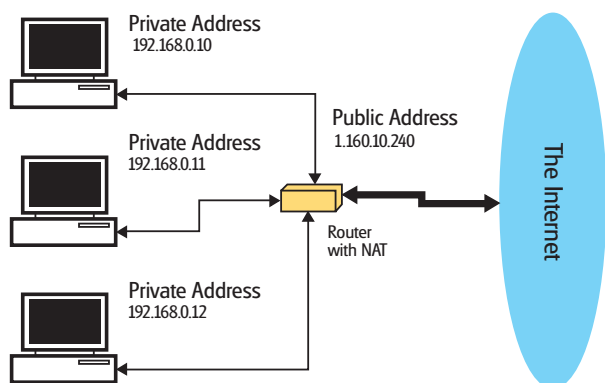
their password or user name, it can still be breached. Don't forget to change password and user names on a regular basis, to limit any potential breach.

Verdict

Security software is no longer an option. The decision to install antivirus, anti-spyware and firewall software is not the same as upgrading an application. There are enough malevolent users of the Internet to make protection against their activities vital. We're not saying this to scaremonger, but simply to impress the point that there are too many PCs on the Internet in the UK, which are vulnerable to attack from viruses and worms.

A worrying statistic, published recently by Symantec, is that there are more PCs hijacked into botnets in the UK than in any other country. This is, apparently, partly because of the rapid introduction of broadband into the UK and partly because of ignorance of the threat.

It doesn't have to cost you anything to put basic protection in place. You can download copies of AVG AntiVirus to protect against virus attack, Microsoft's AntiSpyware to deal with worms and other spies and ZoneAlarm to boost the strength of your firewall. With just those three applications running, you're much less likely to suffer an attack. But for greater peace of mind, you should think seriously about putting your hand in your pocket to fit a good hardware firewall and extra-strength software. It may cost you £200, but it'll be money very well spent. **PCP**



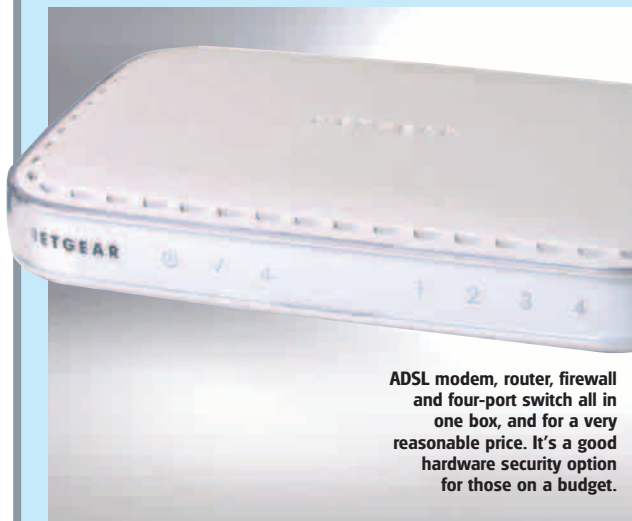
NAT translates a single public IP address that the Internet sees to and from a series of private addresses used on a private network.

network can still have an individual address of its own.

However, the NAT device translates both ways, so packets of data can be addressed correctly in both directions, even though nobody on either side of the NAT

device knows the addresses used on the other side. The translation itself, from one set of network addresses to another, provides a degree of security, usually enough to secure a typical home PC or home network. ■

HARDWARE ROUTER NETGEAR DG834



ADSL modem, router, firewall and four-port switch all in one box, and for a very reasonable price. It's a good hardware security option for those on a budget.

This device is designed for those who want a good, general purpose router with a hardware firewall built-in and includes an ADSL modem and an Ethernet switch. The only thing missing from what you might need in a typical home office environment is wireless support, but we deliberately selected a unit without wireless, since we covered wireless routers not too long ago during our Labs Focus in PC Plus 227.

The DG834 is a fairly utilitarian device, with indicators at the front for power, ADSL connection and the four ports provided by the Ethernet switch. At the rear of the device you will find four RJ-45 sockets for your network and a single connection to your line. If you have a combination ADSL connection, which supports both DSL and analog telephone down the same line, a splitter is included in the box, as is a stand for the router and a pretty substantial black, block power supply.

Physical installation is straightforward and once you've plugged in your PC and line connection you can log in through any Ethernet link and aim your Web browser at <http://192.168.0.1> to connect to the unit's set-up screen. It's not hard to make the appropriate connection and security settings from here, but it would be good if you were forced to change the login username and password from their fairly obvious defaults.

Among the settings on offer you will find content filtering, so you can set up restrictions on particular websites. Interestingly, you can set a schedule for this kind of control so you can, for example, have a different range of settings for evening use from those that dictate your access during the day.

The DG834 provides both NAT and SPI firewall protection and also supports ADSL 2+, a faster connection standard which theoretically provides connection at up to 24Mbps. With most areas of the UK still getting excited about 2Mbps, it'll probably be a number of years before this speed limit becomes an issue, but it is there if your exchange is upgraded.

Netgear has put together a good, mainstream solution in the DG834. It combines all the key components for secure Internet access in a well-priced device. It's a shame there is no direct wireless upgrade path, but otherwise it is well thought-out product. ■

INFORMATION

PRICE £55 (£47 ex VAT)

SUPPLIER www.dsl-warehouse.co.uk, 0870 162 0800

INFO www.netgear.co.uk

WARRANTY Two years, return to base

PCPlus ratings

NETGEAR DG834

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
OVERALL	8

PCPlus GROUP TEST LAPTOPS

→ Eight laptops take to the stage for a CPU showdown



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**Editor's Choice**

Our top award for products that combine exceptional performance and quality with superb value for money

**Value Award**

Awarded to products that represent outstanding value for money, giving you more bangs per buck

**Value Award**

Awarded to products that represent outstanding value for money, giving you more bangs per buck

**Alan Dexter**

alan.dexter@futurenet.co.uk

Alan owns three laptops, including a desktop replacement and an Apple iBook. We don't know how he got the latter, but it's the only one not in bits

Processor elimination

If you're after a new laptop, you'll find a wealth of processors vying for your attention. Alan Dexter looks at the options

There was a time when laptops were nothing more than the muted cousins of desktop machines. Such portable computers used the same components as their anchored brethren, weighed about the same, and offered temperamental battery lives that could get you from A to B only as long as you didn't actually turn the machine on.

Fast-forward to the present day and the computer landscape couldn't be more different. Laptop technology has not only caught up with the desktop offerings, but is actually pushing the industry forward in some areas. You only have to look at the attention the Pentium M and the latest minuscule hard drives have received to see how important mobile PCs have become.

Such prominence has introduced a rather intriguing problem, though: there are now so many components

you can build laptops out of that it's difficult to know where to start. And if there's one area that this overabundance of parts affects more than any other, it has to be the core of any PC: the processor. If you include all of the different speed steps, cache configurations and chip generations, then there's an overwhelming array of options to be considered by the would-be laptop buyer.

This is where our Group Test comes in. We've asked all of the major laptop manufacturers to supply machines based around the most important processors, to give you the best overview for buying a laptop. You can use the information in this Group Test to help you select an impressive all-in-one package or, alternatively, you can just extract the information on each processor to help you make a more informed decision about the chip that will power your next laptop.

**Your guarantee**

The manufacturers have guaranteed that these laptops will be available with their featured specifications while this issue of PC Plus is on sale – from 10/05/05 to 06/06/05. Any component changes will be due to unforeseen shortages. Note: replacement parts may increase the system price.

How we test

Each laptop is tested to its limits to bring you definitive results

Testing laptops can be a frustrating experience. Ascertaining how good any given machine is at powering serious software and entertainment titles, while at the same time assessing the battery life in relation to such workloads, is tricky. Factor in the difference produced from running each machine at different brightness settings, and there appears to be an almost overwhelming task to benchmark these systems. This is where MobileMark 2002 comes in. This is a set of tests that accurately mimics the usage patterns of machines at normal tasks, while monitoring battery performance.

Despite having an almost perfect solution in MobileMark 2002, most laptops in this test fail to run the benchmarks on the first attempt. Couple this with the fact that the test needs to be run on each machine twice, so as to ascertain the difference that the screen brightness has on the battery life, and you have an incredible number of hours of testing to produce the figures necessary.

There is one major proviso with MobileMark 2002: it requires a long enough battery life to run through the first complete cycle of the test before a score can be given. This is fine for the majority of laptops, especially when the screen brightness is reduced to extend battery life, but it does cause



The performance and battery life of each laptop is tested using MobileMark 2002.

problems with the less mobile desktop replacements. In such cases, a separate program is run at the same time as MobileMark that monitors the battery life of the tests.

To test the graphic capabilities of these machines, we use a combination of 3DMark 2003 and 3DMark 2005. 3DMark 2003 is an exacting test of any laptop graphics engine, and a high score guarantees smooth frame rates and support for the latest effects and titles. The latter still isn't really being challenged by desktop machines yet,

so its inclusion here is mainly to make comparisons between normal desktops and the desktop replacements that little bit easier.

In addition to the usual gamut of tests, the processor benchmarks of SiSoftware Sandra 2005 are also used. These legacy tests may not represent the performance of the overall machine, but they do give a useful metric that enables each CPU to be judged against the competition. The results from these tests can be found in the feature tables towards the end of this Group Test. ■

DELL Inspiron 6000

INFORMATION

PRICE £899 (£765 ex VAT)
DELIVERY £58 (£49 ex VAT)
SUPPLIER Dell 0870 907 5818
INFO www.dell.co.uk
WARRANTY One year collect and return

Dell knows a thing or two about piecing laptops together, and the Inspiron 6000 is testament to this. Its subtly attractive design helps disguise the intrinsically chunky chassis, to produce a machine that is as well specified and powerful as it is pleasing to the eye. The inclusion of a DVD±RW writer, in combination with an acceptable set of speakers and wide-screen display, make for a capable multimedia machine too, as well as an office workhorse.

There are various versions of the Inspiron 6000 available, pitched at a range of price points. Although it's hard to tell from the price, this is actually one of the more expensive builds you can buy, boasting an Intel Pentium M 740 processor, 512MB of 400MHz DDR2 RAM and an ATI Mobility Radeon X300 graphics engine. In case you're not up on your Intel nomenclature, this means that you have a 1.73GHz Dothan processor running on a 533MHz front side bus with 2MB of level 2 cache – the most up to date chip in this test.

The X300 is a fairly modern graphics subsystem, but it isn't really cutting-edge, and you're going to have difficulty running the latest games at the laptop's default screen resolution

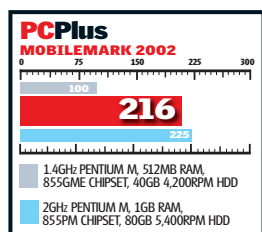


of 1,680x1,050. It should be able to struggle with the less-demanding titles at lower resolutions, but if you're serious about gaming, then the MESH machine is definitely the better option. The standard screen resolution makes the fonts a little small for a 15.4in display, but the added precision is welcome for day-to-day use where desktop space is at a premium.

This selection of quality hardware conspires to push the Inspiron 6000 to the front of the group in terms of MobileMark 2002 performance, with an impressive result of 216. Rather surprisingly for such a good score, the battery life is also strong, with the

machine only running out of power after three and a half hours of continued use at the darkest usable screen setting. However, with the screen set as bright as possible, you're looking at a much reduced figure of less than two and a half hours.

Admittedly, this isn't the lightest or most compact laptop that you'll ever lay your hands on, but it's a well-rounded system that offers strong performance and good battery life. For such an impressive machine, it's surprising that it doesn't cost more, but then that's one of the benefits of buying from the largest PC manufacturer in the world.



PCPlus ratings

DELL INSPIRON 6000

Value ●●●●●●●●●●

Features ●●●●●●●●●●

Performance ●●●●●●●●●●

OVERALL 9

EVESHAM Voyager 5750 S26

INFORMATION

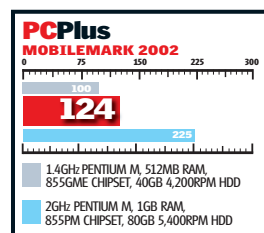
PRICE £649 (£552 ex VAT)

DELIVERY £40 (£34)

SUPPLIER Evesham 0870 160 9500

INFO www.evesham.com

WARRANTY Three years (first year on-site, third year return to base)



PCPlus ratings

EVESHAM VOYAGER 5750 S26

Value: ●●●●●●●●●●

Features: ●●●●●●●●●●

Performance: ●●●●●●●●●●

OVERALL

6

Dell has an understanding with Intel that means it has never built a laptop using one of AMD's chips. Evesham isn't limited by such constraints and quite happily produces laptops using Intel and AMD processors. The Voyager 5750 S26 is one of the latest machines to roll off its production lines, and the option to use AMD's most affordable processor, the Sempron 2600+, means that the company can produce a fully specified machine that's much cheaper than a lot of the competition.

This Sempron processor is clocked at 1.6GHz and packs 128kb of level 2 cache. This discrete level 2 cache works in a different way to Intel's design, integrating with the two 64kb banks of level 1 cache to try to keep the chip's performance competitive despite the relatively low clock speed. This processor has been joined by the VIA K8N800 chipset, which offers an integrated graphics engine in the form of the VIA/S3 UniChrome Pro IGP. As with most integrated solutions, this doesn't have any localised memory, but rather grabs a 64MB chunk of the system memory for its own use. This is enough for most applications, but it's not as fast as having its own RAM



to call upon. The 3DMark 2003 result of 107 puts this engine level with Intel's 855GM graphics solution, too, which is fairly unimpressive.

When it comes to office performance, it pays to bear in mind the price tag that's attached to this system. As long as you don't expect too much from a machine that's this affordable, you won't be disappointed. A result of 124 from MobileMark 2002 may not impress when compared to the other machines here, but it's testament to the advances in mobile design that this is considered a lowly result. The battery life of over two

hours isn't too exciting though, and Intel still has a sizeable lead here.

Evesham has used a boxy, no-frills chassis for the Voyager 5750. It certainly won't win any design awards, and the extra space on offer hasn't been used too cleverly, but the keyboard is comfortable to use, and having all of the USB ports on the left-hand side does make them accessible. It's a shame the right-hand side is port-free, though.

Overall, this is a moderately unexciting machine that has one major selling point: its phenomenally low price tag. However, there are better deals to be had for a little more cash.

HI-GRADE Notino C7000i-1600

INFORMATION

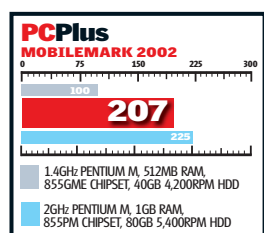
PRICE £821 (£699 ex VAT)

DELIVERY Included

SUPPLIER Hi-Grade 020 8532 6111

INFO www.higrade.com

WARRANTY Two years return to base



PCPlus ratings

HI-GRADE NOTINO C7000i-1600

Value: ●●●●●●●●●●

Features: ●●●●●●●●●●

Performance: ●●●●●●●●●●

OVERALL

8

Modern laptops are modular by design, leaving little room for a company to stamp its own style on the machine beyond gluing a badge to the lid. The most important choice as far as individuality is concerned is the chassis selection, because this defines the capabilities of the system and also dictates its size, weight and look. Such chassis also dictate the type of screens that can be used.

Hi-Grade has selected a reasonably svelte case for the Notino C7000i but, unfortunately, the overall impression errs towards the cheap side of the market, which is a real shame. This chassis hasn't been designed with ease of access in mind, either: all of the ports and connectors are positioned on the rear of the machine, which is frustrating when you consider the right-hand side of the system is blank. Sliding the DVD writer into the front of the system is a nice touch, though.

This rendition of the Notino is built on the Intel Pentium M 725 processor. The chip uses the newer Dothan core, boasts 2MB of level 2 cache and runs at 1.6GHz on a 400MHz front side bus. Compare this specification to the 740 employed by Dell and it's a little surprising that the



performance delta isn't broader. The MobileMark score of 207 is a mere nine points behind the faster chip.

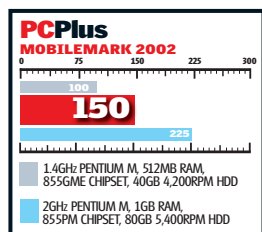
The effect that screen brightness can have on the battery life of a machine can be startling, and the Notino C7000i shows this succinctly. Use the machine with the screen dimmed to its lowest setting and you're looking at nearly five hours of continued use. Bump up the brightness and this almost halves. In practice, you'll probably want to use something in between the two of these, or switch between them as required, but there's definitely potential here for long continued use.

The Notino C7000i uses Intel's ageing 855GME chipset, complete with rudimentary integrated graphics, so this isn't aimed at the budding gamer. This can partition off 64MB of the main system memory for its own use, but you can set it up for less, and indeed Hi-Grade ships the machine with only 8MB set aside, which is more than enough for normal use.

The Notino C7000i-1600 is a well thought-out system that will handle any mainstream task you could ask of it. The only problem is that Dell's machine is only a little more expensive, yet offers better performance, graphics capabilities and styling.

JVC MP-XP731

INFORMATION

PRICE £1,748 (£1,488 ex VAT)**DELIVERY** Included**SUPPLIER** JVC 0870 330 5000**INFO** www.jvc.co.uk**WARRANTY** One year

PCPlus ratings

JVC MP-XP731

Value: ●●●●●●●●●●●●●●●●

Features: ●●●●●●●●●●●●●●●●

Performance: ●●●●●●●●●●●●●●●●

OVERALL 6

The XP7 is the smallest member of JVC's mini note series. Far smaller than a standard laptop, this is a machine for when you want to do everything you can on a normal PC, but don't want to carry around several pounds of silicon, plastic and metal. The more diminutive systems do bring a certain amount of style with them, and JVC hasn't wasted the potential, producing a PC that most will lust after. It's not just a pretty face though.

The clasp that holds the clamshell shut is fiddly to release (you wouldn't be able to do it one-handed), but this should ensure that it never opens accidentally. Once you open the clamshell, you'll be confronted by the 1,024x600px wide screen display and the smaller-than-normal keyboard. There isn't room for a touchpad, so JVC has employed a stick controller, which can be infuriating (at least initially).

Despite its size, the MP-X731 is aimed squarely at serious users. Windows XP Professional ships by default, and Microsoft Office 2000 and Norton AntiVirus make for considerable flexibility straight out-of-the-box.

In order to provide enough power for the numerous uses this machine can be applied to, JVC has used the



ultra-low voltage spin of the original Pentium M. The minimal cooling requirements of this chip fit well with the system's tiny form factor, which is essential as there's only enough room for one vent. Configured to operate at up to 1GHz, the chip runs slower than this most of the time, throttling back performance until it's needed.

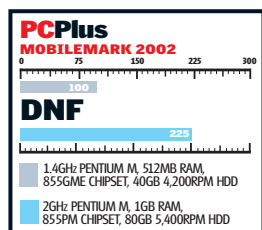
The reasonably stingy 256MB of RAM doesn't appear to hinder the mini note when it comes to performance, but if you want to really stress this machine, doubling the memory is a good idea. The 40GB hard drive is impressive for its size, as is the battery

life of well over four hours. The MobileMark 2002 score of 150 is reasonable for such a machine, sitting in the middle of the pack performance-wise, and showing that it's capable of impressive things. You can effectively ignore 3D performance though, because there's nothing of interest here.

JVC has got a lot right with the XP731. The tiny footprint, smart design and relatively impressive specification make for a machine that will put any PDAs to shame. It's not a perfect solution though, because it's ridiculously expensive and the dependence on an external optical drive does irritate.

MESH Ultima Pro PCI-E

INFORMATION

PRICE £1,526 (£1,299 ex VAT)**DELIVERY** £46 (£39 ex VAT)**SUPPLIER** Mesh 0870 046 4747**INFO** www.meshcomputers.com**WARRANTY** Three years return to base (years two and three cover labour only)

PCPlus ratings

MESH ULTIMA PRO PCI-E

Value: ●●●●●●●●●●●●●●●●

Features: ●●●●●●●●●●●●●●●●

Performance: ●●●●●●●●●●●●●●●●

OVERALL 7

The Mesh Ultima Pro PCI-E is a massive laptop, both physically and in concept. Calling it a desktop replacement barely hints at the scale of the Ultima Pro PCI-E, and indeed in many fundamental respects, it's actually more of a desktop than a mobile laptop. This really isn't a system you would want to lug around with you on a train, plane or even in your automobile. On a more positive note, however, it's in a different league to the other laptops here when it comes to performance.

The sheer scale of the chassis means that MESH has complete freedom over its selection of processor, and it's seized the opportunity to cram one of Intel's desktop CPUs into the stylish chassis. The Pentium 4 550 is the only processor here to offer HyperThreading support and, as it runs at 3.4GHz on an 800MHz FSB, its performance is in a different league to the more portable machines in this Group Test.

The Ultima Pro is designed for use on a desk and, as such, battery life hasn't been a driving force for MESH. This does undermine the very concept of a portable laptop, and it also means that we couldn't get a MobileMark



result from the machine, because it ran out of power before managing to complete one cycle of the test.

MESH uses an X-Glass screen for the display, which offers better image quality than the usual laptop fare, but it does suffer from reflections in office situations. Such displays do look great when working with graphics and playing back DVDs and games, but we still need convincing that this is a mainstream solution, particularly where offices are concerned.

As the screen is the centre-point of this machine, it makes sense that MESH has installed a powerful graphics

engine too. The Nvidia GeForce Go 6800 is a stunning graphics chip, and the results garnered from this system can put many desktop PCs to shame. The fact that it ships with 256MB of RAM shows how serious an option it is, and this definitely helps it produce scores of 9,136 and 3,686 in 3DMark 2003 and 2005 respectively.

If you're looking for a laptop that's as powerful as most desktops, and you don't mind that it's too heavy to use on your lap (or realistically carry around with you), then this is the one for you. It's certainly not cheap, but it does pack a serious wallop.

MV Sirius 15 AMD

INFORMATION

PRICE £704 (£599 ex VAT)

DELIVERY £40 (£34 ex VAT)

SUPPLIER MV 0871 855 4668

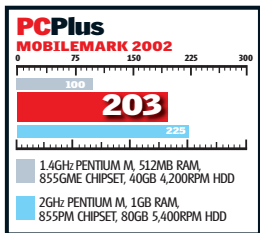
INFO www.go-mv.com

WARRANTY Three years return to base (years two and three cover labour only)

The Pentium M may be a powerful processor, but it does cost considerably more than the competition. This has left a gap in the market for affordable alternatives, a segment of the market that AMD is only too eager to fill. You'll find the mobile rendition of the Athlon 64 in this budget-focused laptop. Running at 2GHz, this mobile part uses the same naming convention as AMD's other CPUs, in this case going by the moniker '3400+.'

The Sirius 15 AMD uses the same chassis as the Evesham Voyager, a point that isn't necessarily in MV's favour. For a machine that uses such up to date technology, it seems perverse that the case looks like it was around when the 486 first appeared. Such retro styling may appeal to some but, even then, the location of the ports and connectors can be unnecessarily fiddly.

The full-size keyboard is comfortable to use, though the decision to place the [Page Up] and [Page Down] keys to the right of the [Enter] key does makes for some unwanted navigation. The off-centre touch pad is a little on the small side, though, and while the mouse buttons



PCPlus ratings

MV SIRIUS 15 AMD

Value ●●●●●●●●●●

Features ●●●●●●●●●●

Performance ●●●●●●●●●●

OVERALL 7

look stylish, they're not particularly easy to use. The inclusion of a small webcam above the display is a nice touch at least.

The Sirius 15 AMD makes a real challenge for the performance crown in MobileMark, though ultimately it has to settle for a third-place finish behind the two Pentium M processors. A score of 203 is impressive, especially at such a low price point, but unfortunately, this is undermined by the awful battery life that averages out at less than an hour and a half of continued use. AMD's chips do use PowerNow! technology to increase battery life, but this obviously

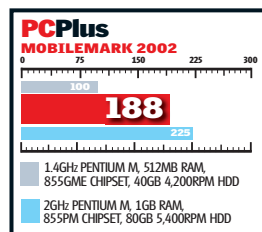
isn't nearly enough to take on the might of Centrino.

For a processor that carries a mobile moniker, this doesn't make for a particularly cool running, or quiet, system. The low background whine is audible in normal office conditions, and positively noisy if you're focusing on the entertainment aspects of the system. The fans don't spin constantly, but this actually just makes the noise produced all the more startling. A better cooling solution to accompany the strong performance would be a positive step forward, which is hopefully what AMD is aiming for with its Turion 64 chip.

TINY Notebook 64 3700+

INFORMATION

PRICE £899 (£765 ex VAT)
DELIVERY £40 (£34 ex VAT)
SUPPLIER Tiny Computers 0870 830 3156
INFO <http://laptops.tiny.com>
WARRANTY One year return to base



PCPlus ratings

TINY NOTEBOOK 64 3700+

Value ●●●●●●●●●●

Features ●●●●●●●●●●

Performance ●●●●●●●●●●

OVERALL 8

Tiny has selected a good-looking chassis for this powerful machine. Somewhat reminiscent of HP systems we've seen before, the silver flashes complement the swathe of black to produce a classy machine. We're a little concerned about the grill above the processor fan, though, as it would be easy to spill something across the keyboard and damage the machine. This is one reason why most laptops have side vents.

Underneath this temperature-controlled fan, you'll find an Athlon 64 3700+ processor that operates at a speedy 2.4GHz. Rated at 400MHz faster than the chip in MV's machine, we were somewhat surprised by the MobileMark results that had this system trailing its nearest competitor. This is even more puzzling as Tiny has equipped the system with no less than 1GB of PC3200 RAM.

The impressive specification continues with the 80GB hard drive as standard, an 8x dual-layer DVD writer from NEC, FireWire support and, finally, a quality graphics engine in the form of a Mobility Radeon 9700 from ATI. This is an impressive feature-set, which pits this machine up against the similarly priced Dell Inspiron 6000 well.



The better graphics performance on offer from this system does give it the slight edge in graphics-intensive applications and games, but overall, it's an incredibly close fight. The 3DMark 2003 score of 3,108 shows that the machine is powerful enough to handle the less-demanding titles, at least at the lower resolutions. Unfortunately, the screen doesn't scale particularly well from its default setting of 1,280x800.

There's one significant difference between these systems, though, and that's in the battery life, with Dell's machine offering far better stamina. In testing, we saw no discernable

difference in battery performance whether the screen brightness was set to high or low. This would indicate that the lamps used to illuminate the screen aren't configured to make the best use of the machine's power saving, which could mean that there's potential for an improved battery life with tweaking.

Overall, there's a lot to like about this machine, and were it not for the Pentium M-powered Dell system, this would appeal even more. Ultimately, the average battery life of less than two hours makes this a less appealing machine than it could have been, which is a shame.

The future of desktop replacements

They're big, bulky, and not really that portable. So what do they have to offer?

Depending on your outlook, modern desktop replacements are either a complete abomination of the portable computer concept, or the best thing to ever happen to the computing world. While we can understand the point of view of the latter, it's hard not to consider the former when looking at such machines. The MESH Ultima Pro, for instance, is a laptop only in name. It's a massive machine that could almost be used as a desk. It's powerful and impressive, but it's not really a portable computer, being too heavy and offering a terrible battery life.

Despite this lack of portability, there's a healthy market for such machines, because they're much more flexible than a large beige box that can hog a serious chunk of our desks and/or homes, and

are nearly as powerful. There's a new alternative, though, and while many manufacturers have tried similar stunts before, the most recent laptop/desktop crossover to enjoy any kind of success is none other than the Mac Mini.

Essentially a laptop that's been squeezed into the most discreet box possible, the Mac Mini is the desktop replacement taken to the next level. It's a laptop, but it also works as a desktop replacement. No more straining at bizarre angles trying to view a screen that's forever stuck at the wrong angle due to its attachment to the main computer chassis. Gone are the non-standard keyboards and frustrating pointing devices, and in their place, there are a wealth of proper input and output devices.

Of course, there's absolutely no reason why a PC manufacturer can't take the Mac Mini concept and develop it further. Intel has shown a concept machine that worked to a similar ethos at the last Intel Developer Forum, while the surge to make 2005 the year of the Media Center PC should definitely see a need for such svelte boxes.



Is this the ultimate desktop replacement? It could be that PCs are following Apple's lead once again.

The eagerness that surrounds the migration of the Pentium M to the desktop shows that this isn't just a solution that portable lovers are looking for, either. If a manufacturer can produce a system that looks good, is powerful and is well priced, it should open the market for desktop fans too. And Intel, AMD and Microsoft et al need to come up with a solution soon, otherwise we could all find that Apple-branded biscuit tin winging its way into our homes. ■



Search your memory banks

The processor isn't the only component that affects your laptop's speed

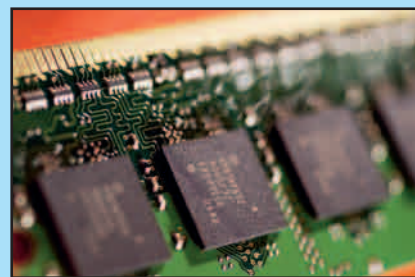
Throughout this Group Test, we've concentrated on the processor as the central definer of your laptop's performance. This is mainly because of the wealth of options available in this area. However, we don't want to give the impression that the CPU is the only component that impacts system performance. There's no point in running a 3.4GHz Pentium 4 if you're going to run into data bottlenecks throughout the rest of the machine.

The most notorious subsystem for producing bottlenecks is the memory. This is why system builders are keen to pack in large amounts of RAM, and to make it as fast as possible. We've been forcing faster and faster data rates out of the DDR architecture for many years now, to the point where 533MHz DIMMs are now commonplace.

But if Intel has its way, that's where it stops. The Californian giant has decided that the DDR

architecture has served its purpose. The new Sonoma platform, which is now starting to find its way into most manufacturers' product lines, moves DDR2 into the mobile arena. However, it's still far from universal. AMD is unlikely to put its backing behind the new architecture any time this year, and as you can see in this Group Test, Intel's older Centrino platform is still abundant.

On the face of it, DDR2 is an obvious step forward. Its great advantage is that it enables faster clock speeds without huge ramps in terms of power usage. This is because it increases the amount of data 'prefetched' in each clock cycle from two bits to four, effectively doubling the bandwidth without increasing the core clock speed. Manufacturers are therefore able to make faster DIMMs without sacrificing efficiency. Crucial has already taken the architecture to



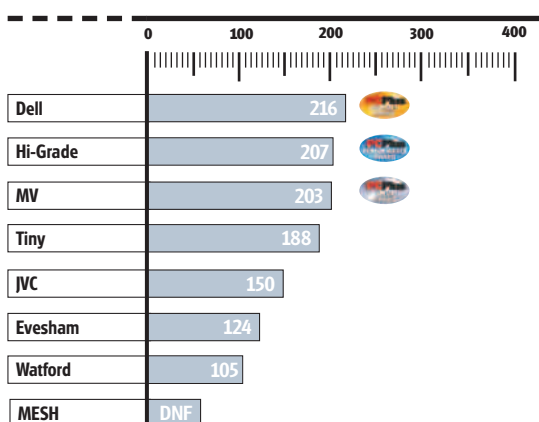
The low power requirement of DDR2 is a boon for notebooks, and speeds are increasing all the time.

800MHz, and we have no reason to believe it will stop there.

However, DDR2 has one major problem, and that's latency. The CAS Latency for such is well above those for DDR. For example, DDR2-400 has a latency of 3, compared to the readily available DDR400's 2. However fast the DIMMs run, this high latency is always going to prevent them from drastically improving system performance. ■

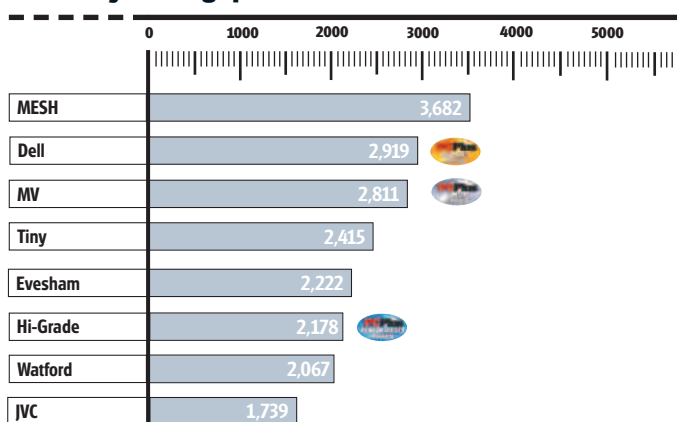
Performance test results

MobileMark 2002



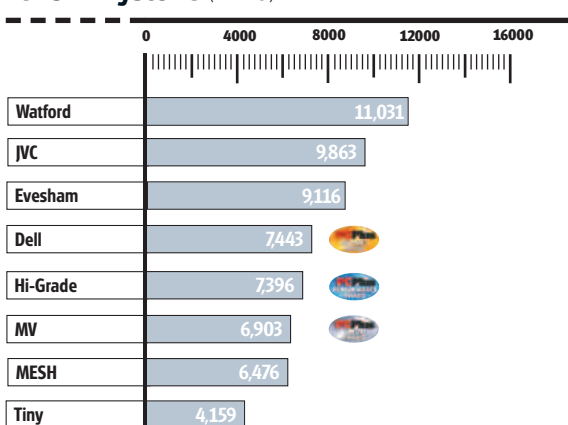
Bigger is better

Memory Throughput (MB/s)



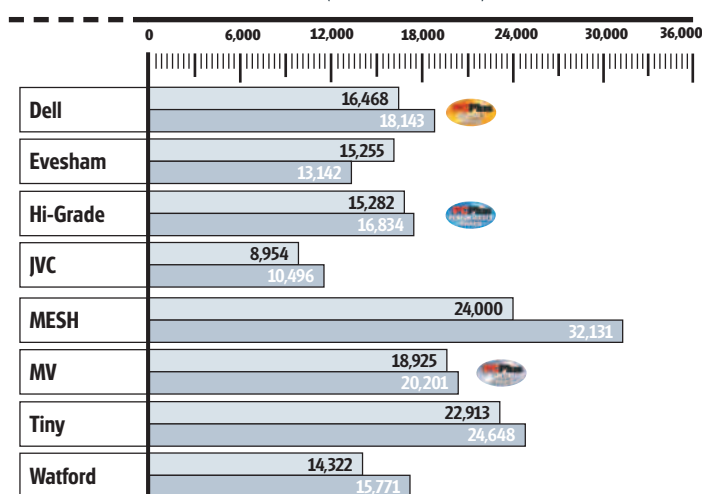
Bigger is better

CPU Dhrystone (MIPS)



Bigger is better

CPU multimedia int/FPU (iterations/sec)



Bigger is better

CPU multimedia int/FPU (it/s) CPU multimedia FPU (it/s) CPU multimedia int (it/s) CPU multimedia FPU (it/s)

WATFORD Aries Precision 1101

INFORMATION

PRICE £775 (£659 ex VAT)

DELIVERY £18 (£15 ex VAT)

SUPPLIER Watford Electronics

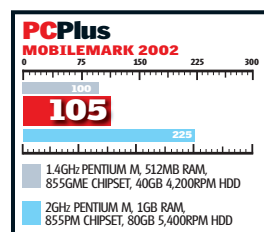
INFO www.savastore.com

WARRANTY One year return to base (years two and three cover labour only)

It's easy to forget about the likes of the Celeron in these days of the Pentium M, but such chips are still available. Do they have a place in a market that's striving to reach battery performance in the four-hour region? Watford produces a version of the Precision 1101 that uses the Celeron M processor, and this is it.

Apart from a slight blip in its past when it could be used in dual-processor motherboards, the Celeron has always been viewed with a certain amount of disdain. Created by Intel to answer the needs of the more budget-conscious user, Celerons have always offered slower clock speeds and lower caches than the more expensive performance parts. This is true here as well, though the fact that you get 1MB of level 2 cache, a 400MHz FSB and a chip running at 1.5GHz actually compares well with the competition – on paper at least.

In practice, this machine produced the lowest result of any of the systems here, with a score of 105 in MobileMark 2002. This trails AMD's budget offering by a small amount, with the battery performance defining the real difference between the machines. At less than an hour and a



PC Plus ratings

WATFORD ARIES PRECISION 1101

Value ●●●●●●●●●●

Features ●●●●●●●●●●

Performance ●●●●●●●●●●

OVERALL 7

half, this may be small enough to carry around easily, but it needs to offer far more in the way of stamina if this machine is really going to make an impact. There wasn't much difference in battery life between the screen settings either, but with a larger battery, this may come into play more.

The Precision 1101's styling is similar to Apple's PowerBook range, offering the choice of a white keyboard. Admittedly, the quality of the keyboard isn't quite up to the standard that Mac fans are used to, with some obvious movement, but at least it's a full-size affair. The touchpad is a decent size,

though the accompanying buttons are extremely small and tricky to use.

The 12.1in wide-screen display is certainly the system high point, with the default resolution of 1,280x800 producing a nice clear image. The contrast and colour rendering is impressive, but this is somewhat wasted as the system doesn't ship with a DVD player (something you'll have to provide yourself). Luckily, wireless networking is provided by default, but unfortunately, the graphics capabilities of the machine are somewhat unimpressive.

Processing on the move

What makes the Pentium M so suitable for mobile environments?

Intel has attracted a lot of negative reaction for its desktop processors. However, you can't really argue that its mobile platform is leagues ahead of the rest of the competition. Designed from the ground up with mobile performance and power requirements in mind, Intel's Centrino has long defined the standard for mobile computing. Featuring several advantages over other Intel chips and the equivalents from AMD. At least it does until AMD starts shipping its greatly anticipated Centrino beater, the Turion 64.

The big advantage this chip offers is its better running efficiency. As a straight comparison, no Pentium Ms ever use more power than 30W, whereas the more demanding Pentium 4s max out at about 80W. However, this doesn't tell the whole story. With the 855 chipset comes some of the famous Centrino power-saving technology: intelligent power distribution, SpeedStepping, and so on.

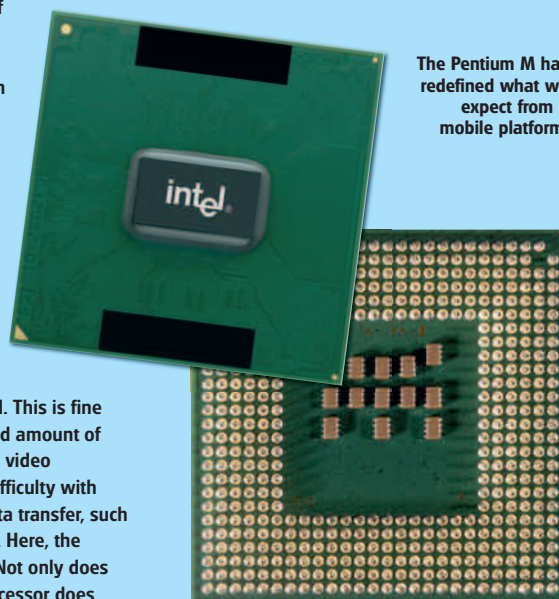
Perhaps the most predictable benefit to the Pentium M is a much lower running temperature. After all, one of the main points of the mobile-specialist design is better thermal properties. Even after heavy loading over a long period of time, the processor remains cool to the touch. This lack of heat production also has implications on volume – the Pentium M needs just one small, slow fan to keep it cool, so thankfully the only real

noise you ever have to endure is a rather subtle whirring sound.

The boon that some people may not expect is stunning application performance. Running a 2GHz Pentium M and 1GB of DDR333 RAM (the fastest the 855 chipset will support), we produced a SYSmark 2004 score of 160, which translates to a PC Plus Benchmark Index of 1.23. This is about what you would expect from a 3.2GHz or 3.4GHz Pentium 4. However, even SYSmark doesn't do full justice to the 855 platform, as it's much more powerful in certain types of applications.

The reason for this specialisation is the difference between the Pentium 4 and Pentium M architectures. The Pentium 4 uses a much longer pipeline, and therefore relies greatly on prefetching for its speed. This is fine for applications where the type and amount of information is predictable, such as video streaming. However, it runs into difficulty with more complicated, inconsistent data transfer, such as that associated with user input. Here, the estimated code is often incorrect. Not only does this mean wasted time, as the processor does

away with the incorrect code and fetches the appropriate replacement, it clogs up the pipeline, meaning that all processes are slowed down. The Pentium M uses a much shorter pipeline and relies much less on prefetching. It therefore excels in anything that requires flexibility. ■



The Pentium M has redefined what we expect from a mobile platform.

This month's contenders up close...



DETAILS

Manufacturer	Dell	Evesham	Hi-Grade	JVC
Model	Inspiron 6000	Voyager 5750 S26	Notino C7000i-1600	MP-XP731
Price	£899 (£765 ex VAT)	£649 (£552 ex VAT)	£821 (£699 ex VAT)	£1,748 (£1,488 ex VAT)
Delivery	£58 (£49 ex VAT)	£40 (£34 ex VAT)	Included	Included
Supplier	Dell 0870 907 5818	Evesham 0870 160 9500	Hi-Grade 020 8532 6111	JVC 0870 330 5000
Info	www.dell.co.uk	www.evesham.com	www.hi-grade.com	www.jvc.co.uk
Warranty	One year collect and return	3 years (1st yr on-site, 2 yrs RTB)	Two years RTB	One year RTB
Extra Battery Cost	£68 (£58 ex VAT)	£90 (£77 ex VAT)	£112 (£95 ex VAT)	Not available

SPECIFICATIONS

CPU	Intel Pentium M 740	Mobile AMD Sempron 2600+	Intel Pentium M 725	Intel Pentium M ULV
Speed	1.73GHz	1.6GHz	1.6GHz	1.0GHz
Front Side Bus	533MHz	400MHz	400MHz	400MHz
Level 2 Cache	2MB	128KB	2MB	1MB
RAM	512MB DDR2 400MHz	512MB DDR333	512MB DDR333	256MB DDR266
Core Logic	Intel 855GME	VIA K8N800	Intel 855GME	Intel 855GM
HDD	60GB (4,200rpm)	40GB (5,400rpm)	60GB (4,200rpm)	40GB (4,200rpm)
Drives	8x DVD±RW	4x DVD±RW	DVD-ROM/CD-RW	None
Graphics Card	ATI Mobility Radeon X300	S3 UniChrome Pro IGP	Intel 855GME	Intel 855GM
Graphics Memory	64MB	64MB	64MB	64MB
Screen	15.4in	15in	15in	8.9in
Resolution	1,680x1,050	1,024x768	1,024x768	1,024x600
Sound	SigmaTel C-Major Audio	Realtek AC'97	Crystal WDM AC'97	SoundMAX
Speakers	2x internal	2x internal	2x internal	2x internal
Comms	802.11bg Wi-Fi, 10/100 Ethernet, 56K modem	802.11bg Wi-Fi, 10/100 Ethernet, 56K modem	802.11bg Wi-Fi, 10/100 Ethernet, 56K modem	802.11b Wi-Fi, 100 Ethernet, 56K modem
Ports	4x USB 2.0, 4-pin FireWire, PCMCIA Type II, VGA-out, S-Video out, SD Card Reader, Stereo line-out, microphone-in	3x USB 2.0, PS/2, serial, parallel, PCMCIA Type II, VGA-out, SD Card Reader, Stereo line-out, microphone-in, headphone	3x USB 2.0, 4-pin FireWire, parallel, PCMCIA Type II, Infrared, VGA-out, S-Video out, SD Card Reader, Stereo line-out, line-in	2x USB 2.0, 4-pin FireWire, PCMCIA Type II, VGA-out, headphone out, microphone in
Other Hardware	None	None	None	USB 2.0 DVD-ROM/CD-RW Combo drive
OS	Windows XP Home Edition	Windows XP Home Edition	Windows XP Home Edition	Windows XP Professional Edition
Other Software	Sonic RecordNow!, Microsoft Works 7	Roxio Easy Media Creator 7, Microsoft Works 8	Ability Office	Microsoft Office 2000, Norton AntiVirus, Pinnacle Studio 8SE
Dimensions	356x266x39	329x275x37	326x270x30	225x30x177
Weight	3.5Kg	3.5Kg	2.7Kg	1.1Kg
Carry Case	No	Yes	Yes	No

RESULTS

MobileMark 2002	216	124	207	150
Battery (low brightness)	216	142	287	262
Battery (high brightness)	160	128	164	263
Average Battery Life (mins)	188	135	226	263
3DMark 2003	2,541	107	114	102
3DMark 2005	991	0	0	0
Memory Throughput (MB/s)	2,919	2,222	2,178	1,739
CPU Dhrystone (MIPS)	7,443	7396	6,903	4,159
CPU Whetstone (MFLIPS)	2,402	2,519	2,230	1,322
CPU Whetstone (SSE2)	3,075	1,620	2,853	1,783
CPU Multimedia Int (it/s)	16,468	15,255	15,282	8,954
CPU Multimedia FPU (it/s)	18,143	13,142	16,834	10,496

PC Plus verdict 9

PC Plus verdict 6

PC Plus verdict 8

PC Plus verdict 6



				DETAILS
MESH	MV	Tiny	Watford	Manufacturer
Ultima Pro PCI-E	Sirius AMD	Notebook 64 3700+	Aries Precision 1101	Model
£1,526 (£1,299 ex VAT)	£704 (£599 ex VAT)	£899 (£765 ex VAT)	£775 (£659 ex VAT)	Price
£46 (£39 ex VAT)	£40 (£34 ex VAT)	£40 (£34 ex VAT)	£18 (£15 ex VAT)	Delivery
MESH 0870 046 4747	MV 0871 855 4668	Tiny 0870 830 3156	Watford Electronics	Supplier
www.meshcomputers.com	www.go-mv.com	www.tiny.com	www.savastore.com	Info
Three years RTB	Three years RTB	One year RTB	1st yr RTB, 2 yrs RTB (labour only)	Warranty
£116 (£99 ex VAT)	£116 (£99 ex VAT)	£100 (£85 ex VAT)	Not available	Extra Battery Cost

SPECIFICATIONS

Intel Pentium 4 550	Mobile AMD Athlon 64 3400+	AMD Athlon 64 3700+	Intel Celeron M	CPU
3.4GHz	2GHz	2.4GHz	1.5GHz	Speed
800MHz	400MHz	400MHz	400MHz	Front Side Bus
1MB	1MB	1MB	1MB	Level 2 Cache
512MB DDR2 533MHz	512MB DDR400	1GB DDR400	256MB DDR333	RAM
Intel 915	VIA K8M400	SIS 755	SIS 661	Core Logic
80GB (4,200rpm)	60GB (4,200rpm)	80GB (4,200rpm)	30GB (4,200rpm)	HDD
Sony 8x DVD-RW	8x DL DVD±RW	8x DL DVD±RW	DVD-ROM/CD-RW	Drives
Nvidia GeForce Go 6800	S3 UniChrome Pro IGP	ATI Mobility Radeon 9700	Intel Celeron M	Graphics Card
256MB	64MB	64MB	64MB	Graphics Memory
17.1in	15in	15.4in	21.1in	Screen
1,680x1,050	1,024x768	1,280x800	1,280x800	Resolution
SoundBlaster Audigy 2 ZS PCMCIA card	Realtek AC'97	Realtek AC'97	Realtek AC'97	Sound
4x internal plus subwoofer	2x internal	2x internal	2x internal	Speakers
8802.11bg Wi-Fi, gigabit Ethernet, 56K modem, Bluetooth	802.11bg Wi-Fi, 10/100 Ethernet, 56K modem	802.11g Wi-Fi, 10/100 Ethernet, 56K modem	802.11bg, 10/100 Ethernet 56K modem	Comms
4x USB 2.0, 2x 4-pin FireWire, Infrared, S-Video, Line-out, Line-in, Microphone, Headphone, Memory card reader, PCMCIA Type II, serial parallel, DVI, PS/2	3x USB 2.0, PS/2, serial, parallel, PCMCIA Type II, VGA-out, SD Card Reader, Stereo line-out, microphone-in, headphone	3x USB 2.0, 4-pin FireWire, parallel, SD card reader, PCMCIA Type II, SPDIF-out, Microphone, Headphones, Infrared, VGA-out, S-Video out	3x USB 2.0, 4-pin FireWire, SD card reader, PCMCIA Type II, SPDIF-out, Microphone, Headphones, VGA-out	Ports
AverMedia TV Tuner, Webcam	Webcam	None	None	Other Hardware
Windows XP Home Edition	Windows XP Home Edition	Windows XP Home Edition	Windows XP Home Edition	OS
Microsoft Works 8	Roxio Easy Media Creator 7, Ability Office 2002	Microsoft Works 7, CyberLink Power Suite	None	Other Software
397x298x50	329x275x37	358x275x40	303x225x28	Dimensions
6Kg	3.5Kg	3.5Kg	1.8Kg	Weight
Yes	Yes	No	No	Carry Case

RESULTS

DNF	203	188	105	MobileMark 2002
65	91	116	90	Battery (low brightness)
60	76	116	75	Battery (high brightness)
63	84	116	83	Average Battery Life (mins)
9,136	122	3,108	120	3DMark 2003
3,686	0	1,307	0	3DMark 2005
3,682	2,811	2,415	2,067	Memory Throughput (MB/s)
9,863	9,116	11,031	6,476	CPU Dhrystone (MIPS)
4,033	3,109	3,794	2,090	CPU Whetstone (MFLOPS)
6,866	4,027	4,876	2,673	CPU Whetstone (SSE2)
24,000	18,925	22,913	14,322	CPU Multimedia Int (it/s)
32,131	20,201	24,648	15,771	CPU Multimedia FPU (it/s)

PCPlus verdict 7

PCPlus verdict 7

PCPlus verdict 8

PCPlus verdict 8

PCPlus Verdict

Which processor powers the best laptop? It's time to filter out the chaff and select an overall winner



EDITOR'S CHOICE

Dell Inspiron 6000

PRICE £899 (£765 ex VAT)
DELIVERY £58 (£49 ex VAT)
SUPPLIER Dell 0870 907 5818
INFO www.dell.co.uk
WARRANTY One year collect and return



Dell enjoys a privileged position in the PC market thanks to its sell-through rate and sheer size of the business. The company can buy the components for its machines in such large quantities that it can shave its margins and knock out computers far cheaper than the majority of the competition.

While this sounds sinister, when the end result is as good as this, it's hard not to be impressed by the giant's vision. The Inspiron 6000 is an impressive machine that's stylish enough to stand out from the

crowd, yet powerful enough to beat all the other machines in this test in the MobileMark benchmark. Add to this the average battery life in excess of three hours, the full connectivity package that comes with any Centrino chipset, and you have a laptop that defines the standard by which others should be judged. Not perfect, but fairly close, and all at a stunning price.

PCPlus verdict 1 2 3 4 5 6 7 8 9 10

ANALYSIS

We've come a long, long way together

It's impossible to look at laptops and not end up falling in love with the performance and battery life of Intel's Centrino. AMD has made up some ground on its old rival in this department, at least in terms of straight performance, but it still lags some way behind when it comes to battery life. The promise offered by Turion 64 could see AMD wrestle dominance away from Intel, but it could turn up to the party too late to make any noticeable difference. We'll have to wait and see.

Of the machines reviewed, a couple stood out from the crowd, with the Dell Inspiron 6000 just beating the Tiny Notebook 64 3700+ to the winner's rostrum thanks to its solid stamina and performance. The MESH Ultima Pro PCI-E figured heavily in our considerations for the Performance award, though the sheer size of the unit and the woeful battery life ultimately meant that the award went elsewhere. You could argue that desktop replacements don't need to be moved around, in which case feel free to take a look at this machine. For general use and mobility, it really doesn't appeal.

The final machine we want to mention here is the JVC mini note. This is a truly wonderful piece of kit that shows the extremes to which the technology can be pushed and yet still be useful. We would have preferred a slightly bigger keyboard (there is a version of the machine available with an optical drive integrated into the base unit), but it's the cost that stops it being worth considering. When you realise that you could buy two laptops for this price, with both outperforming this unit, it makes it hard to justify such a purchase.

In the end, regardless of whether you want a general machine, a desktop replacement or an ultra portable, there's a processor out there that has been specifically designed for the task. Choose wisely and enjoy the freedom.



BEST VALUE

MV Sirius 15 AMD

PRICE £704 (£599 ex VAT)
DELIVERY £40 (£34 ex VAT)
SUPPLIER MV 0871 855 4668
INFO www.go-mv.com
WARRANTY Three years return to base (years two and three cover labour only)

The Sirius 15 AMD isn't the cheapest machine here, but it does offer a reasonable amount of power for a relatively low cash outlay. Ideally, we would recommend spending a hundred pounds more on a laptop, but if you're shopping to a tight budget, then this will serve you well, as long as you can hang around a power point once you've bought it. This isn't an ideal solution for the gamer, but you do get a sturdy warranty thrown in for your money.

PCPlus verdict 1 2 3 4 5 6 7 8 9 10



BEST PERFORMER

Hi-Grade Notino

PRICE £821 (£699 ex VAT)
DELIVERY Included
SUPPLIER Hi-Grade 020 8532 6111
INFO www.higrade.com
WARRANTY Two years return to base

In this Group Test, performance is more than just the speed at which a laptop can do the work; it also includes the battery life on offer. This combination of stamina and power is best typified in the Notino C7000i, which managed the second fastest score in the MobileMark 2002 test, and also produced the longest battery life with the screen turned down to the lowest brightness setting. Not too surprisingly, this is a Pentium M machine.

PCPlus verdict 1 2 3 4 5 6 7 8 9 10

PCPlus HELPDESK

→ We solve your computing problems

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Paul Grosse and Wilf Hey tackle your computer problems, from skins and a hidden script editor to the biggest file on your system

REGISTERING SOFTWARE

Complicated registrations

Q Why do some software products have a registration process where you have to key an enormously long password? It's hard to do it without error, so the process is unnecessarily very long. Recently I downloaded a product from the Internet that sported such a registration process. You download the product from their website and the password is sent to your email account. It took quite a while before I was able to get the number right.
Thomas Bowker

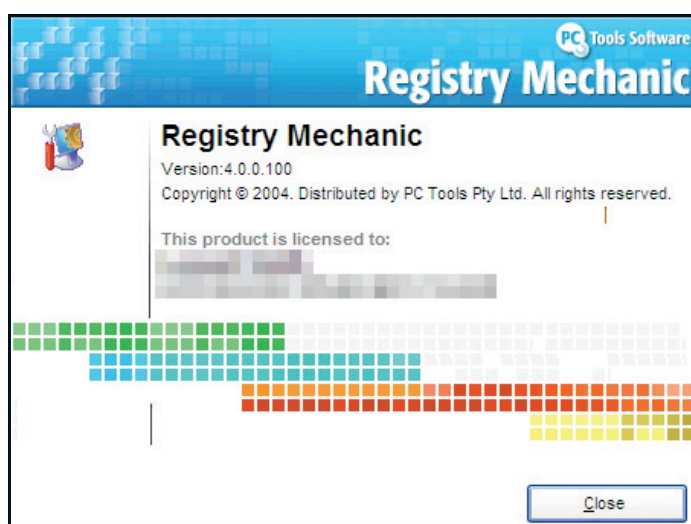
A If it were easy to type in the registration key it would be easy for others to steal the right to unlock their own unregistered copy of the software, so we can't strongly argue your case for making it easier.

But we've got a tip to make things speedier for you. If you download a program and get the registration key in your email, hold down [Shift] and left mouse button, run over the key in the email document, then press [CTRL]+[C]. This will move it to the clipboard. Back in the registration page of the program itself hit [CTRL]+[V] to drop the perfect copy into the correct place. This is one of those places where cut and paste works even though there are no cut and paste buttons anywhere.

PDF DOCUMENTS

Incorporating watermarks

Q A couple of months ago, I needed to convert some documents into PDF format and I decided to try an old version of Jaws PDF Creator which came free with PC Plus, way back in February 2002. I was very impressed with the results but the trial version you supplied had no support for watermarks which I am going to need.



If you've downloaded software from the Internet and purchased and received a registration key by email, there's an easy way to activate the software.

The Jaws PDF website suggests that watermarks are supported via an optional plug-in. However, it gives no information about what the plug-in is called or how to obtain it. How can I get some information about this plug-in? I'm only trying to find out what it's called. Surely it can't be a closely guarded secret, can it?
John Emmas

A There's a relatively new piece of inexpensive software available as shareware (try for free before you buy) that claims to do the job directly to the document, rather than as a plug-in. We can't vouch for it being what you need, but it is a full-featured utility and it's certainly worth the effort of downloading it and giving it a try. The program (called PDFStamp) is available for downloading from www.verypdf.com/pdfstamp/.

Alternatively, use a word processor that produces PDF files directly, such as OpenOffice.org. In fact, there is little in the way of limitation with this because anything that you can produce on the screen will be exported into the PDF, including watermarks.

To generate a watermark in OOo, select Format | Page | Background | [tab] | As | Graphic, then browse for the file you want. By doing this you can store your watermarks in a directory as pixel map files (such as .jpeg, .bmp, .png) or as vector graphics files (for example .wmf, .svm) then you can load or change them as required.

All you do to create the PDF file is click on File | Export as PDF... I type a file name, click on 'Save' and then, in the 'PDF Options' dialog box, select the pages you want and the compression level you need.

The compression level affects pixel map images the most, including gradient fills on vector drawings with flat fills being totally unaffected. This is due to the high level of compression used to produce the screen level of compression. However, at print or press, the quality is fair. To give you an idea of just how much compression is used, an example including a pixel map image with vector graphics as the watermark produced file sizes of 6.4kB, 71kB and 110kB respectively.

You can, of course conduct an Internet search (via Google, or

Contact us

helpdesk@pcplus.co.uk

Fax – 01225 732 295

Write to: HelpDesk, Future Publishing,
30 Monmouth Street, Bath BA1 2BW

HelpDesk welcomes questions, tips and follow-ups to published items, but please note that we can only respond via the pages of the magazine.

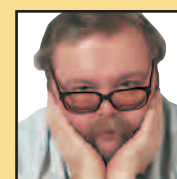


<http://forum.pcplus.co.uk>



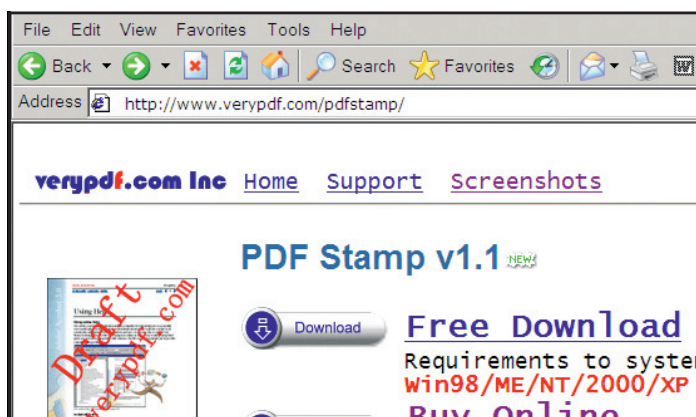
Paul Grosse
helpdesk@pcplus.co.uk

Paul is so enthusiastic, he's networked his toaster. It's become self-aware and is in a relationship with his microwave



Wilf Hey
helpdesk@pcplus.co.uk

Wilf has a good idea of how fast things change in IT. He says that he doesn't make predictions and never will



The Internet is a prime source for information about specialised software that will suit your particular needs. Surprisingly often this software is inexpensive or even free.

Alltheweb, or any other search engines. Use the keys PDF and watermark and you will soon be guided to details of similar products.

WINDOWS XP

Caps Lock no more

A while ago we told you of ways to disable the Caps Lock key on your keyboard, but it was dependent on you having a re-map capability. When you buy a new keyboard, odds are that it will come with helpful software that includes a re-mapper. Still, most people are content just to remove the old and plug in the new, without changing drivers.

We discovered that in Windows XP, the system provides a way of re-mapping control keys, even though it's not immediately apparent how to do so. In the Keyboard Layout area of the Registry, you probably won't find a Scancode Map parameter, but if you were to supply one it would define the interpretation put to the various control keys.

On the SuperDisc we provide a morsel of code called NoCapsLock. Before you use it do make sure you have adequate means of recovering, in case of error during Registry change. Once you are sure, double-click on this small file and your Registry will be automatically updated with the addition of, or

change to, the Scancode Map so that the Caps Lock key becomes a new Caps key (really a swap shift key, like the Shift key itself). You'll have to restart your system for the change to come into effect.

WINDOWS XP DESKTOP

XP classical styling

Q I have chosen to have the classical style for the Start menu in Windows XP (Professional), but there is one facet of it that is new, and quite unnecessary. The cascading menus off the root Start menu seem to open in one of two ways: an abbreviated form with a little knob at the bottom, or a full form with a varying grey background. Clicking on the knob expands the menu, but why do I have to do it? And why are some entries on a different background? At first I thought it depended on whether I had added items myself. How do I deal with it, and what's its purpose?
Bernard Wild

A The abbreviated form of each menu shows only the most used entries, so any you have edited recently will be more likely to show. When you expand the view, all the entries are shown with, the less used ones against a slightly lighter grey background. In a large local network it

WRITE IN

Email your questions to:
helpdesk@pcplus.co.uk

Or write to:
HelpDesk, PC Plus
30 Monmouth Street
Bath BA1 2BW
Or fax: 01225 732 295
HelpDesk welcomes questions, tips and follow-ups to published items, but please note that we can only respond via the pages of the magazine.

HELP US HELP YOU!

We get thousands of emails each month, so please send your messages to the correct address. Email SuperDisc problems to
pcplus.support@futurenet.co.uk

Printing in Word

Accommodating wide print lines using Microsoft Word

"I spent most of last Sunday, most of an ink cartridge and a ream of paper printing out a series of documents from the web," writes Charlie Fane. "When I got round to collating the paper and punching holes in it for filing, I noticed that all through it many lines were missing the last few words on the right.

"I went back to the site, linked to all the documents again, and copied them via the clipboard into Word. From there I tried to change the point size of everything and also drew in the right margin. But all of this was to no avail, possibly because much of the text was

tabular. When I tried printing with landscape mode, I ended up with tiny lettering surrounded by a sea of white space for each page. Short of looking up the owner of the website and throttling him, what can I do?"

Unfortunately, these wide, printer-unfriendly text and table widths are quite common on the Internet. We suggest that first of all you copy the documents into Word, imagining the data as a book, with each chapter being an unbroken page of text. Copy a chapter onto the clipboard using [CTRL]+[A] then [CTRL]+[C]. Drop it into

Word with [CTRL]+[V], then [CTRL]+[END] to position you at the end. Turn your attention back to the Internet browser and repeat this with each chapter.

Then go back to Word. In the File menu choose 'Print', and in the 'Scale to Paper Size' option box select 'Legal Size'. Bring up the printer's 'Properties' page using the button at the top right corner and select 'Landscape'. Press 'OK', then press it again to start printing the page again. This should give you normal size text with room for long lines on the right, printed sideways on A4 paper. ■



Text width on many websites are screen, but not print, friendly. Using Word you can produce unusual but crisp, clear printing.



Take administrator rights out of the equation as much as possible, but you may have to buy all of your software again.

Windows security

Don't listen to Bill – please do worry about Windows security

While Windows security is generally considered 'sad', there are things you should do about it. First up is making sure that normal users run as a user without any special privileges. This includes the administrator, when he is not doing systems administration.

If you go into Start | Settings | Control Panel | User Accounts, then click

on an account and 'Change the account type'. The two account types are 'Computer Administrator' which can do anything, and 'Limited' which is, as the name suggests, far more restricted.

Now comes the crunch. With a 'Limited' account, programs that were designed before Windows XP or 2000 might not work properly, and so you

would have to re-purchase all of your programs for versions that have the 'Designed for Windows XP' logo.

However, you do have a choice. You can either: (re)purchase only the programs you really need, or you can use the open source equivalents. These are often backward compatible with the MS programs. ■

may be useful to hide unusual entries, since some programs and files will only be used by a supervisor.

You can turn off this feature by clicking on a bare spot on the Taskbar (usually along the bottom of the screen). Click on 'Properties', select the 'Start Menu' tab, click on the 'Customise' button, then remove the tick from the 'Use Personalized Menus' at the bottom of the scrolling list. Click on 'OK' to close both dialog boxes, and terminate your Windows session normally. Your system may appear to stall a few seconds after pressing each of the 'OK' buttons, but don't worry. The result will be that those cascading menus will be full, and no shade of difference will appear between items.

WORD

Word counts

If you used Word in earlier incarnations, you'll know how awkward it was to establish word counts, because they weren't always on screen. You had to dig them up under the Tools drop-down menu.

By putting the count among the standard status bars at the top of the screen, Word from version 2002 makes word counts accessible. It's good to get used to pressing [Alt][C] to update the displayed count (rather than clicking the button), because it's handy for measuring the size of text you have highlighted.

WINDOWS EXPLORER

Mirror, mirror on the wall...

Q Why does Windows Explorer sort its display of filenames within a folder into reverse alphabetical order? This has always piqued my interest, as I see no real reason for it. Some pictures in HelpDesk also suggest that you can have a navigation panel (showing the hierarchy of folders) on the left side. That's not on my version (Windows 98 SE). Is this a feature of Windows Explorer in XP?
James Mackenzie

A Your Windows Explorer is capable of this too, and the reverse alphabetical sort order is only one possible display. There is no reason for you to be locked into that format, because Explorer itself gives you scope to change many things about its display. And you probably know about the choice between tiles, icons, list and detail, which you can choose by checking one of the options in the View drop-down menu.

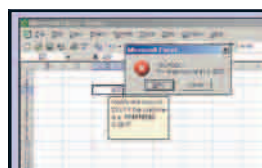
You can sort the items' order in 'Detail' view by clicking on the 'Names' header immediately over the 'Detail' list – on alternate clicks it changes between alphabetical and reverse alphabetical. One great use for this is that in alphabetical order all the sub-folders are grouped at the top, and in reverse order they are at the bottom. In

very populous folders you may find it convenient to get the subfolders to the bottom so that you may more easily get to a particular file.

You can, in fact, sort on any of the fields simply by clicking on the heading over the display. This is particularly useful for grouping together candidate files to treat similarly. You can customise what fields are displayed in detail, and even in what order. In the View menu click on 'Choose Details' (or 'Choose Columns') and investigate for yourself.

Once you have changed the order of fields, don't forget to key [CTRL][+] while on the main panel. This will automatically adjust the width of displayed fields. The hierarchical navigation pane can be turned on by selecting View | Explorer Bar | Folders. We really wouldn't be without it, and make it our default.

More customisation is possible if you click on Tools | Folder | Options | View. It is here that you can also decide whether you want to retain the style you have set, applying it to all instances of Windows Explorer. If not, the changes will only apply to the current folder, and even then you can't guarantee it will stick unless you close Explorer by clicking File | Close. The sensible approach is to decide on your general changes, apply them to all instances, and then go back, modifying the views for certain folders (such as media folders, where you may prefer icon views) by pointing Explorer to them and then re-customising.



You can tailor your worksheet so that an instant message pops up the moment the cursor passes onto a particular cell.

Nifty corrections in Excel

Tooltip equivalents and 'unhiding' help

When you use Excel to create a spreadsheet, you can create your own messages, much like tooltips, that pop up when the cursor lands on a particular cell. The message can be created by positioning focus on the cell, then opening the Data drop-down menu and selecting 'Validation...'. The dialog that this brings up has three tabs: 'Settings' enables you to apply an allowable type and range to the value input to the cell; 'Input Message' gives you the opportunity to write a tip-like message; and 'Error Alert' allows you to

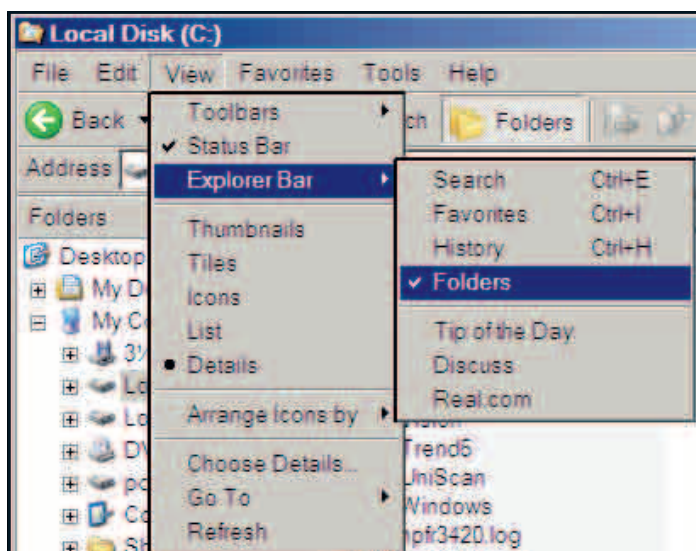
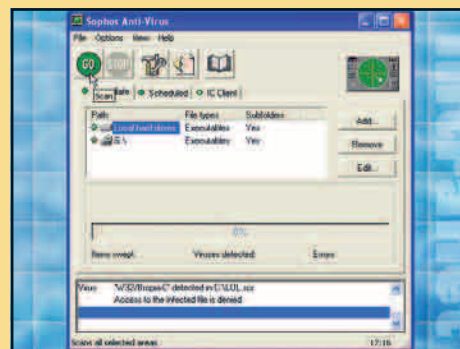
personalise the message if the value input is incorrect. If you don't provide text for 'Error Alert', a standard error message is generated. But beware, the 'Clear All' button at the bottom of each of these tabs does just that. It clears ALL three entries for this cell, both messages and any restriction on cell value.

Reader B. Swale asks how to 'unhide' rows or columns on an Excel worksheet. Simply right-clicking while on the header of a row or column brings up a menu which has 'Hide' and 'Unhide' on it. 'Hide' certainly works, but he couldn't

see where to put the cursor to get 'Unhide' to function, and the Help really doesn't help. If, for example, you have hidden row five, highlight the headers for rows four and six simultaneously, then right-click and select 'Unhide'. If you hide row one, focus on the headers for rows, [CTRL][+][A], then right-click and 'Unhide'. The side effect of the 'Unhide' function is that all rows (in the range) are unhidden, so you may well have to re-hide others. And un hiding row one involves un hiding all rows. You can also 'Hide' and 'Unhide' columns. ■

TOP TIP

Antivirus technology is one of the key lines of defence. It's used not only to protect your own computer, but everybody else on the Internet who's next in line for an attack from a virus. Make every effort to keep your antivirus program up to date – for everyone's sake.



You can personalise your experience with Windows Explorer in many ways, suiting it to your own taste – or better still, to your own work pattern.

MICROSOFT OFFICE

One they don't mention

If you have Microsoft Office there is a program in the suite that you probably don't know about. The Microsoft Script Editor is, for some, very useful. It goes beyond Notepad, avoids the complication of Word and ends up being just the right thing for viewing or editing scripts. It also provides a little more information hidden within some INI files, and it tells you everything about an RTE.

You will have to search for it, though. It is probably in the Office subfolder within Program Files, and it will be an EXE file with a name starting with MSE. Use MSE*.EXE for searching. Why not make a shortcut to it? Even if you don't need it now, it may prove useful in the future.

WINDOWS DESKTOP

Built-in shortcuts

The various key combinations and shortcut links to programs provided

in Windows are all very good, and can cut down on time and effort. There are some that are overlooked, though. They're not exactly shortcuts, but are easy to remember and navigate. You see, many important folders can be reached by using the Run feature, near the bottom of the Start menu. It's all part and parcel of the way Windows works when you click on a name. What's the program associated with a folder name? None other than Windows Explorer.

In the Run box, key just the word 'Fonts' and the 'Fonts' folder will be ready for you to inspect or modify. This will also work with 'Cursors', 'Desktop', 'Media', 'Send-to' and 'Web'. Try others to see if they can be opened the same way.

And you can open Explorer on one of these folders in a similar way, even from within MS-DOS. Key 'Start' with the folder name following.

MICROSOFT WORD

Split a Word in half

Q Last year in HelpDesk, you had a screenshot in which Word was showing two different parts of the same file, one part in the top half, and the other in the bottom half. Of course it's possible that this was just conceptual, but it would be great to know how to get this kind of view in Word. Is it really possible?

Chas Fulbright

XMMS

Skins

If the default black and blue XMMS skin is too dark for you to be able to see anything on your monitor, you can add to the selection of skins by downloading them from the X MultiMedia Systems website at www.xmms.org/skins.php. The one in the screenshot is Winamp X (XMMS version) v1.01. Just download the .tar.gz or .zip file and save it into the /usr/share/xmms/Skins directory. Note that there is no need to expand the archive file, as this is done by XMMS.



Windows system tools

Why do they hide them?

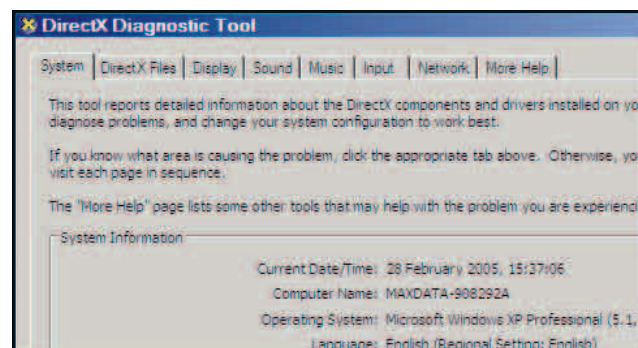
Every city and town must have them: an elite handful of knowledgeable PC engineers who pass on valuable morsels of information that serve us well. Well, this pleasing bit of info is from one of these very gurus. His name is David Maslen, and he's right here in the home of PC Plus, Bath.

Dave asked us what was the speed of an old processor, and we simply didn't know. It was missing from both the System and the Hardware profiles, and we didn't have a benchmark program to hand. What a conundrum.

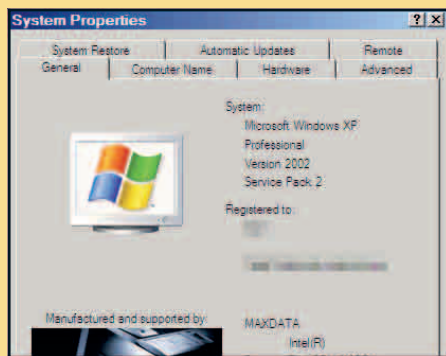
Never fear, said Dave, you can run dxdiag.exe, which you'll find, by the way, in the Windows\System folder.

If it's not there, you will no doubt find a file with dxdiag as its name. It'll be the installer, so just run it. After this, you can run dxdiag from the 'Run' dialog on the Start menu or better still, you can create a shortcut to it.

Try some of the tests on each tab. They are useful and informative. And, just so you know, your processor's speed is found at the System tab: the figure ending in GHz (Giga-Hertz). ■

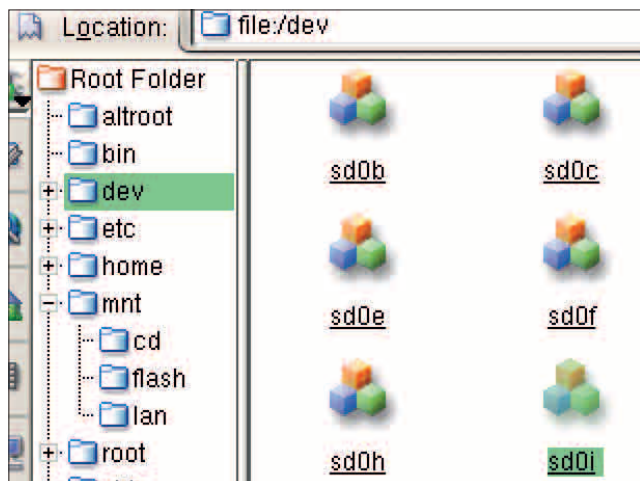


Dxdiag does a multitude of tests on a vast array of the hardware attached to your system. But why, oh why, is it hidden away without mention?



TOP TIP

Where is that ever-so-useful System Properties dialog? Oh yes, it's at 'Start', 'Settings', 'Control Panel', 'System' applet. You can find it much easier, with [FLAG][Break]. [Break] is normally to be found on the upper-right part of the keyboard.



The partition on a USB flashdisk that you want to mount is not 'a'. So just use disklabel to find out which it is.

A Yes it's possible to open up two viewpoints on the same file. And, as you can well imagine, on occasion it is extremely useful. At the very top of the scroll bar column there is a small lozenge. It looks as if it is resting on the square with the up arrowhead in it. Move the mouse cursor over it, and the cursor will change to a little device with arrows pointing up and down from its middle. Click down on that lozenge. Hold down the left mouse button, and a horizontal strip of grey will appear across the width of the screen. Keeping the left mouse button firmly pressed, drag this line downwards. It divides the current view

into two parts, each of which can be changed independently of the other. Note, however, that you are still looking at only one file, so when you close one section you will close both.

You can rejoin the two parts by grabbing the horizontal line and drawing it back upwards, holding down the left mouse button as you do so.

WINDOWS

Clean reinstallation

Q On the recommendation of a telephone helpdesk, I reinstalled Windows, and I would now like to clear up my machine. However, I've run into difficulties. Either I can't uninstall a program, or the computer won't even load up the uninstaller. My hard drive is virtually full and I am desperate to clear it out. I haven't really been able to do much at all since I reinstalled Windows, so almost anything is a viable option for me. What can I do to end up with a clean machine, not stuffed with junk that I can't get rid of without devoting at least a week to sorting out?

Chris Lasley

A Reinstalling Windows is a favourite of the telephone helpdesk problems solvers, as it means

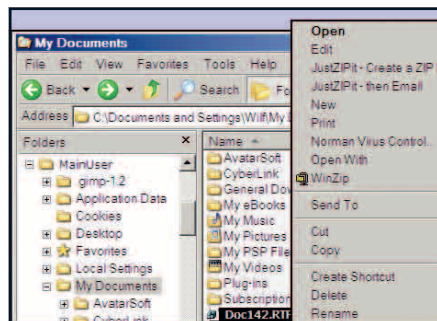
that all of the system variations and customisations you might have introduced over the happy years you have shared with the computer will be destroyed in one go, leaving a system that their question and answer scripts can cope with. Unfortunately, when you do reinstall Windows, it does not clean out the system and hence you are left with all of the DLLs and other program files still there. These are what will be cluttering up your disk, and causing you much annoyance.

As the Registry has been rewritten, the registration of those DLLs has also been destroyed, so the system doesn't know what should be there and, as Windows programs find out where their DLLs are by looking in the Registry, the programs you had installed prior to reinstalling Windows will probably fail. This will be the case even if you double-click on the .exe file in Windows Explorer.

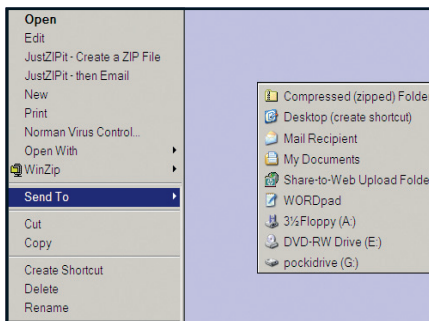
When the Registry goes, it is like a Cerebro-Vascular Accident has torn through the computer's perception centre. As result, a program it previously knew very well will now be greeted with something like: 'Who are you?' But, unfortunately, in Windows we are all stuck with the Registry.

As your system has effectively been untouched, you are in the privileged position of being able to format (and if necessary, re-partition) your hard drive.

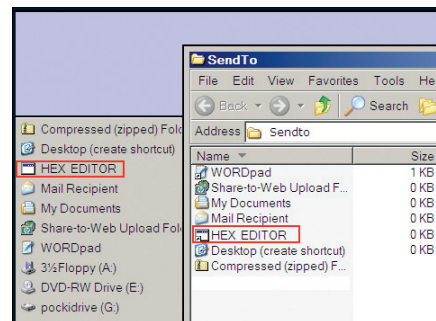
Adding to the 'Send to...' feature



1 One of the handiest tools for browsing through files on your hard disk is the right-click menu. When you right-click on the filename, or icon, a menu appears that allows you to open, rename, delete or copy the associated file. Selecting 'Open' passes the file to the program associated with its extension name. So, DOC files can be opened by Word.



2 If you want to open a file with a different program from usual, you can (in Windows 98). Hold [CTRL] when you right-click, and a new entry appears on the list, 'Open with...'. Another way to accomplish the same effect is to select 'Send to...', except that there is no browsing allowed – program choices are limited to those already present.



3 Search for the 'SendTo' folder, and you can readily modify it, in advance, to contain shortcuts to any program. It is a good idea to place shortcuts to Notepad and Wordpad in it. If you have a hexadecimal viewer this provides an excellent use for it. With a few clicks you can view any data, without even knowing its regularly associated program.

Lost in the dialog

The wonderful world of quality settings, explained

In Windows XP, the 'Print' dialog box enables you to specify the printer's properties for that document. For example, you can change the print settings so that if all you need is a black and white draft copy, you can get one.

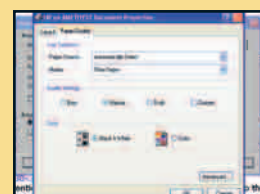
However, if you click on the 'Draft' quality option button and then click on

the 'Black and White' option in the 'Color' [sic] frame, it will reset the quality settings for you. So, if your black and white quality setting is 'Normal', it will go back to 'Normal'.

This is actually the logical thing to do because of the way the dialog box is laid out, and the way the controls take

the focus when you are tabbing through the dialog box.

There isn't really a lot that you can do about this, and, while some people (those who end up with more printer wear and tear along with increased ink consumption) will call it a bug, other people will say they think it's cool. ■



Be aware of this 'programming feature'. If you click on one control, the last one you set is changed.

Just remember to back up any files you hadn't backed up previously. A clean, formatted, new installation of Windows should take your machine back to the pristine state it was in when you first bought it. Then, with the 20:20 vision of hindsight, you can go on to install only what you need.

OPENBSD

Mounting USB disks

Q I've attempted to mount my USB disk on my OpenBSD system, but whenever I use the mount command, it always responds either with 'Device not configured' or with 'Block device required'. I have created a directory called /mnt/flash so that really shouldn't be a problem and I'm pretty sure that the disk should be at /dev/sd0a, but it just doesn't work. Please help!

Dan Sellers

A The mount command follows the following format: Mount somehow something somewhere. The USB disks are then considered either as though they were IDE devices, or as though they were serial devices. You can find out how the system recognises the device by using several methods, one of which is to use the disklabel command. Type:

```
disklabel wd0
```

You should get the information from your hard drive, showing the 4.2BSD partitions. A as the first, normally / partition, b as swap, c as unused, being the whole disk, and so on – from when you installed the system. From this you will be able to see what sort of output the program gives you. If you now type it using 'wd1' instead, you'll be able to see if it is there. If it isn't, you'll get a response along the lines of 'Device not configured' in which case, try using 'sd0'. You could work your way through most of the device types in /dev but one of these should work.

The other way of finding out is not so easy if you have external USB drives plugged in at the back of the computer, but is ideal if you only have a small flashdisk. This method is to have a shell up and running when you insert the drive into the USB socket.

You should get some lines of information as BSD probes the device and, towards the end of these, you should see lines that start off with something like the date and the host name followed by '/bsd: sd0' or similar. This is where your disk is to be found. All you need to do is run disklabel with that device and you will see its partition information.

When you have some meaningful output, you will be able to see that

there are two partitions. C is the whole disk of fstype unused (just like 'wd0' above), and partition i is the partition for the whole flashdisk with MSDOS as the fstype.

You should also be able to see details such as bytes/sector which you would expect with FAT but you will most likely also be able to find sectors/track, sectors/cylinder and cylinders. None of these have any bearing on the physical layout of the device but help it all make sense to the device drivers, as they do with any operating system.

You now know that the device you want to mount is 'sd0i' (or 'wd1i', or whatever you found) and now all you have to do is mount it. You can either do this from the command line like so:

```
mount /dev/sd0i /mnt/flash
```

Alternatively, you can choose to put it in your file system table file /etc/fstab as a line like the following:

```
/dev/sd0i /mnt/flash msdos rw  
0 0
```

If you do this it will run when you run 'mount -a' (if you have an external USB mass-storage device, you can do this). To unmount the flashdisk, just type 'umount /mnt/flash' or whatever the mount point was and then you can safely remove the flashdisk. **PCP**

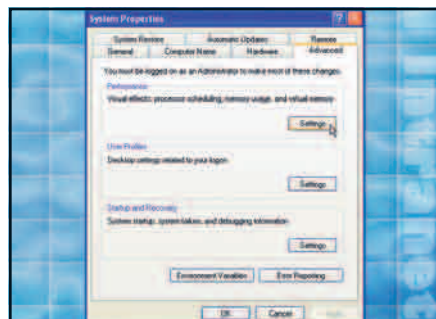
Further Help

If you need an updated driver, or if you need help direct from a manufacturer, first check out their website – a search engine should locate it. Newsgroups are also a great source of help and advice. Your question may already have been answered, so before posting a message search previous postings at http://groups.google.com/advanced_group_search. And don't forget to check PC Plus' own forums at www.pcplus.co.uk.

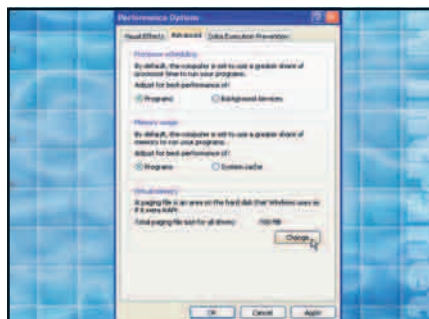


Related files on SuperDisc
See section: HelpDesk

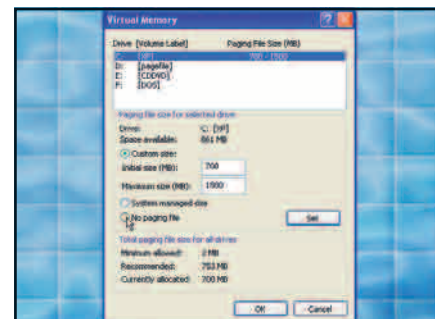
Reinstalled Windows means pagefile.sys has moved



1 If you have reinstalled Windows, you will probably find that the pagefile.sys file has been moved to the default location, C:. If you had it elsewhere, you need to right-click on the 'My Computer' icon either on the Desktop or in Windows Explorer, select 'Properties', click on the 'Advanced' tab and then on the 'Performance Settings' button.



2 The 'Performance Options' dialog box starts off on the 'Visual Effects' tab and while you are there, you can select the 'Custom' option and then un-check any processor-hungry special effects you don't want (pretty much all of them). Click on the 'Advanced' tab and in the bottom frame ('Virtual Memory'), click on the 'Change' button.



3 Finally, click on the drives and adjust the size of the page file. It's usually a good idea to have the page file as a statically sized file so that the system doesn't have to keep finding space for it. This particular tip is from UNIX, which has a special, fast file-format partition just for 'swap'. When finished, click 'Set' and reboot.

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This month, **Paul Grosse** shows you how to install an MP3 encoder on Linux to convert Ogg Vorbis files for use on personal players

MUSIC FILES

Format-specific hardware

Adam Satterwhite writes in saying he needs to buy an MP3 player to use at work, in order to maintain his sanity during an eight hour shift. However, all the players in his price range only play MP3 or other proprietary music file formats. All of his music files are already stored in Ogg Vorbis format on his Linux system, which doesn't support MP3. His problems involve not being able to change all of the Ogg Vorbis files into MP3s, and he doesn't know how large and what type of player he needs to buy.

If quality is your priority, Adam, go back to your CDs and save the MP3 files that your system will create for you. But you won't be able to do this unless you can save files in MP3 format. You'll have to install a program that will encode to MP3. As MP3 is a proprietary format and not included with Linux distributions, you'll have to download the program (or the source) and compile it yourself.

LAME

The oddly named LAME will encode WAV format files to MP3, but first you need to get a copy. You'll find that

almost all of the pre-compiled versions are for Windows or a specific Linux distribution, which we would recommend you try first. If the pre-compiled version doesn't work on your distribution, it's fairly straightforward to compile your own.

Firstly, you need to download the source, so go to <http://lame.sourceforge.net/download/download.html>. Click on the 'important message from the RIAA' link and read it. Then go back and click on the 'Source Code: Click here...' link and the 3.96.1 (or higher) link that ends with '.tar.gz', which will take you to the SourceForge.net download server. Choose a mirror and click on the download link. The .tar.gz should be saved to your normal directory.

The following is fine if you're using a windows manager such as KDE. Right-click on the .tar.gz and, in the drop-down menu, select 'Ark' or Open with... | Utilities | Ark. In Ark, you'll see a list of all of the files and directories in the archive. Click on Action | Extract... and choose somewhere to extract the files. Click on 'OK' and close Ark. Open up Konqueror at the location where you saved the extracted archive and then, in the pane with all of the files in it, right-click on a blank area. On the menu, click on 'Open Terminal Here'. Next, at the command prompt, type the following:

to MP3. Usually, if you want to perform a conversion from one format to another, you can find a program with a name made up of the two file extensions with the number two between. A quick look on Google shows a program (a Perl script by Mark Draheim) called ogg2mp3, found at <http://amor.cms.hu-berlin.de/~h0444y2j/linux.html> which has a download halfway down the page (Files... Just the script).

Save the script somewhere on your system. The root directory where you keep your OGG files will make the following easier, and make sure that it is executable. When you've done this, open up a command shell at that location and type:

```
./ogg2mp3 *
```

If all has gone according to plan, it will start recursively munching its way through your directories of OGG files, translating them to the same filename but with the MP3 extension.

However, you'll probably find that you need to do more first, and the clues are in the ogg2mp3 program script. If you open it up in KWrite or Kate, you'll see that there are a number of things that need to be present. The files 'ogginfo' and 'ogg123' need to be in '/usr/bin/', which they already should be, as you've generated your own OGG files, and you need to make sure that LAME, which you've just compiled, is also in '/usr/bin/'. Alternatively, you can alter the line in the Perl script that tells the script where to expect to find it. If you're missing a Perl module, have a look at the sidebar on the next page.

With all of the locations correct, and with the correct modules installed, ogg2mp3 will now work away recursively (though not necessarily in what we may think is a logical order) until they're all converted. If you have a fairly extensive collection, you may want to think more about spending the time you'll have to wait preparing an

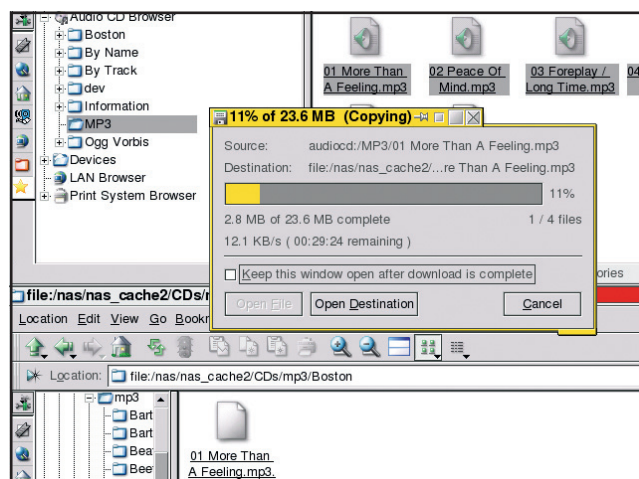
```
./configure
make
make install
```

This will configure, compile and install the program. This isn't instant, but at the end of it, you'll have the MP3 encoder compiled for your own system rather than have a generalised version of it that may have system specific incompatibilities within it.

ogg2mp3

Now that you have your MP3 encoder, you need to have a program that will take your OGG files and convert them

With an MP3 encoder installed, you can drag and drop from your CDs to any directory on your system.



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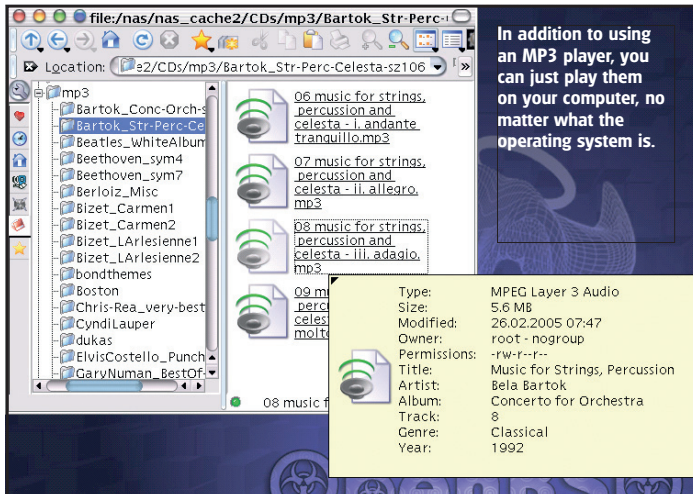
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<http://forum.pcplus.co.uk>


Paul Grosse

helpdesk@pcplus.co.uk

Paul has been a serious computer journalist for years and has no time for trivia. His favourite colour is green



elaborate four-course meal, rather than swiftly nipping off to make a quick cup of coffee.

Once it's finished though, you'll have an MP3 and OGG copy of every single song in your directories. To make using your MP3 player easier, it's better to have the MP3 files in a separate directory, so if you have OGG and MP3 directories with all of the album directories within those, you can use them far more easily.

Using the MP3 player is now just a matter of doing the following: plug the player into the USB port, mount it

(usually as sda1 or similar), open up Konqueror, delete any files or directories that you don't want and copy any new ones across. Then unmount the USB and unplug it.

One thing to be aware of is that USB MP3 players are effectively flash disks and, as such, use 'vfat' (FAT) as the file system (this is so they'll work with Windows machines). The only problem you're likely to encounter with this is if you use camel notation for otherwise identical filenames, so 'NotHere' and 'NoThere' will be the same under vfat.

In addition to using an MP3 player, you can just play them on your computer, no matter what the operating system is.

CD to MP3

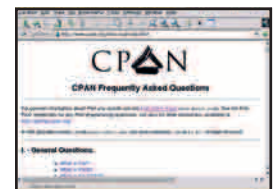
Now you have your MP3 encoder, you can use Konqueror's 'Services' menu. Click on the 'Services' icon and you'll see the CD options available. If you click on MP3, you can highlight the tracks you want, drag them into a directory in another copy of Konqueror, and the encoder will convert the CD's tracks for you (the same will happen with Ogg Vorbis). In this way, you can create new OGG and MP3 files from CDs that you purchase.

At the beginning, we said that it was best to create MP3 files from the CD. The reason for this is that Ogg Vorbis is a lossy compression algorithm, in the same way that MP3 is a lossy compression algorithm. Each algorithm throws away different parts of the data in order to get the compression that it needs, but the reason you shouldn't go from one to the other (in either direction) is that they throw away different parts.

By compressing to Ogg Vorbis, you throw away some data, but by converting it to MP3, you decompress it and throw away some more data. You can never get back the data that was thrown away by the first compression algorithm that you used. However, for a personal MP3 player, quality isn't really the pressing issue. **PCP**

CPAN MODULES

If you only have the basic installation of Perl, you may encounter the problem of not having the Perl modules installed on your system that you need in order to use ogg2mp3. These are File, Getopt and String. If you can't find these on your system installation discs, go to CPAN (on SUSE Linux 8.2, the only one you'll need to download is String), which is at www.cpan.org. Or you can find the RPMs at the RPM Repository, found at http://rpmfind.net/linux/RPM/CPAN_String.html (if you want to download the 'String-ShellQuote module').



If you're missing any of the Perl modules that you need to run ogg2mp3, you can find source and RPMs on the Internet.

Making it all future-proof

Choosing the right MP3 player is not just about size

The question of which MP3 player to buy is still outstanding. The main issues you'll probably want to consider are size and the types of files the player can read. First of all, size.

For an eight hour shift, you're going to need about 400MB of space. But remember, you'll now have the luxury of being able to delete and copy any selection you like, so changing the songs that you listen to will be a lot easier than before. The drives that are available tend to go up in multiples of two, so a 512MB MP3 player will have plenty of space.

If you're planning to get a 1GB or even a 2GB MP3 player, one thing in its favour is that when you turn them back on, they remember where you left off,

so you don't have to scroll through hundreds of tracks trying to find one that you haven't listened to recently.

One word of warning, though, is that when the battery runs out (this is now one of those technologies where everything has become so small that even the single AAA-sized battery weighs almost as much as the rest of it), it only remembers where it was when it was last switched off, which could be as much as six hours ago.

File types are another matter entirely. Each time a music vendor sells an MP3 track, they're responsible for paying Fraunhofer a percentage of each sale in return for them using their patents. Ogg Vorbis is patent and licence-free and, as the quality for a given file size/bit rate

is demonstrably better, it's only natural for music vendors to move over to OGG files given time. Therefore, you will undoubtedly be better off if you invest in an MP3 player that can have its firmware updated.

Apart from getting superior quality with Ogg Vorbis, you'll also be able to get more music on there and, if you buy music online, there's the potential for the savings in licensing to then be passed on to the purchaser (but don't hold your breath). ■

Choose the right solid-state player and you'll be able to upgrade it so it can read Ogg Vorbis files.



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Artificial intelligence meets the power of marketing this month. What's in a name beyond the specifications?

Voices from the past

I'm looking for an article I read in 1986 or 1987 in what I think was your magazine. If PC Plus was published in 1986 or 1987 perhaps you can help me. The article was a review of a piece of software that could carry on a dialogue with the user, or tell a story, I don't remember the details very well. Included in the review was a selection of what the software had produced in a session with the reviewer. The selection was quite entertaining.

Unfortunately, I don't remember the name of the software, the reviewer, or the month and year. May or June of 1986 would be the earliest date that I think I may have read the review. Early Autumn 1987 would be my guess for the latest date. I've wanted to find this review for many years (and a copy of the software, if a copy has survived somewhere), but wasn't sure how to go

"When will the entertainment industry realise it will never stamp out P2P if its products aren't available to download?"

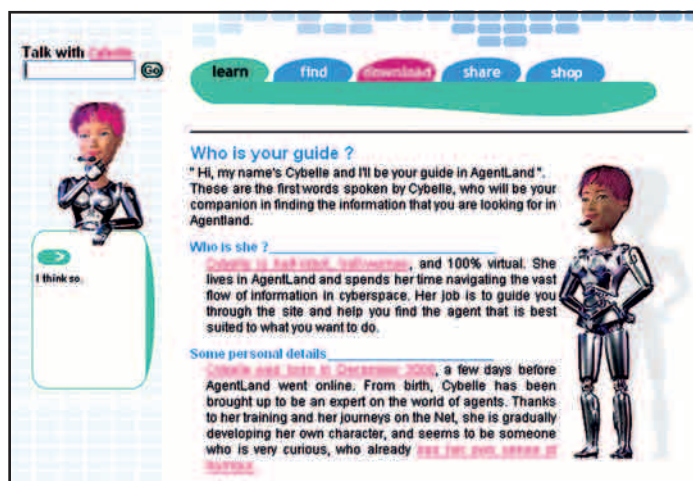
about it, and I wasn't even sure of the name of the magazine. If there's any chance of someone searching for the review, I'd be extremely grateful.

Robert Galbraith

Features Editor, Richard Cobbett replies: We couldn't find anything in our archives, though your request does go back a fair way. There's no shortage of potential candidates, but if we're going back that far, we're probably looking at a variant of ELIZA (developed back in the 1960s). If you're still hunting, www.agentland.com is a good place to find famous chatterbots and their modern successors.

Audio to go?

I recently purchased an Orange SPVM2000 Pocket PC and, during the



What kind of guide would you expect on a site like www.agentland.com? Well, it's the Internet, so pink or blue anime-style hair shouldn't be a surprise.

drive home from work one day, thought what a good idea it would be to purchase some audio books to listen to in the car. I had used Audible before, so I went straight online to see what was available. The titles I wanted were there – The Da Vinci Code by Dan Brown and Stephen King's Dark Tower Series. Great, I thought. I can get two books a month for a mere £11.50.

I signed up and went off to purchase. I couldn't find Dan Brown's Da Vinci Code any more and only two of the seven episodes of The Dark Tower. Weird? I checked out the FAQ and it turns out that there is no UK distribution agreement for these titles – they're only available to US readers! I then checked out some of the P2P search engines and, sure enough, everything I was trying to buy was there to freely download if I wanted it. Not only that, but it was in MP3 format, too.

When will the entertainment industry realise that it will never stamp out illegal P2P trading if it can't get its products available to download through the proper channels? I was sitting there at my PC with my money ready to spend, but was thwarted just because I live in the UK.

I know this isn't Audible's fault – it's just responding to the publishers' demands – but it still seems wrong, especially when I can walk into any



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Ian Robson

ian.robson@pcplus.co.uk

Ian Robson is the editor of PC Plus. When computing first got on to his school curriculum back in the early 1980s, he was hooked

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bookshop and buy a copy. Once again, it seems that making money comes ahead of giving customers what they want. So now I'm listening to Terry Wogan's autobiography, complete with DRM, on my 'activated' Pocket PC. As for Dan Brown, I guess I'll have to buy the old-fashioned paper version.

Richard Warriner

Features Editor, Richard Cobbett replies: I know exactly what you mean. I had exactly the same problem when trying to buy some eBooks for my Pocket PC, and this is

exactly why my iPod's audiobook library is restricted to Spider Robinson and some old Phillip Marlowes. Although, if there's a good use for DRM, preventing people enduring that Da Vinci drivel would certainly be it! Did not being able to download the books I wanted make me eager to buy them later? Nope. I just took them off my list and bought a £5 paperback instead.

Wireless security

Thanks for the detailed article on Wireless Networking in the March 2005

issue, which I found very informative. It gave me a comfortable feeling, because you came down in favour of Linksys kit, which is the same brand I've just been buying!

Our household runs a mixture of Windows XP, 2000 and Linux; a tip for any other readers still using Windows 2000 (and I don't recall having read this anywhere, even though I've looked at several articles on wireless security before taking the plunge) is that WPA encryption is not supported by Microsoft under Windows 2000. There are two ways around this



PRIZE-WINNING STAR LETTER

What's in a name?

Why do PC systems and component manufacturers think that giving their products silly names will make them sell better? All people are bothered about in the real world is what the thing actually does. A series of letters and numbers for a product is less glamorous, but who actually cares? (apart from marketing guys who think they have a great concept).

Take the AOpen Aeolus graphics card series. In ancient Greek mythology, Aeolus was a keeper of winds. AOpen reckons that the graphics card provides 'blasting graphics power beyond imagination'. What a load of guff. Someone not from AOpen clearly imagined and designed the chipset that powers the card enabling someone else (also not from AOpen) to design software that

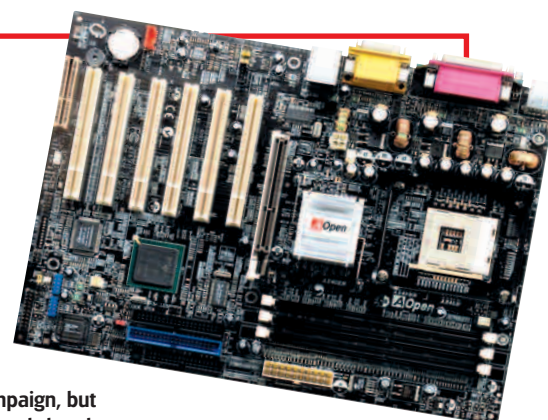
makes use of its features within the limits of their own imagination.

Then you have stuff like Crucial's Ballistix memory range. You would hope they're referring to exterior ballistics (speed or movement of the projectile from the time it leaves the gun) rather than terminal ballistics (effect on impact). It's supposed to be faster than their standard range of memory. We can see that from the rated speed. Why not just use that to sell it in conjunction with their excellent Memory Advisor Tool?

There was a sketch on the BBC Three show, Monkey Dust, about car designers going to a mental asylum on a hill to ask an inmate for the name of their next car. You could apply this to the products currently on the market for PC users.

Mike Simms

Editor, Ian Robson, replies: In-house Classics guru Richard suggests that a king best known for a big bag of hot air would be the ideal symbol for any marketing campaign, but he's a cynic. Hardcore tech-heads will obviously dive for the names and numbers first, but they're not the whole market. Would all the people who once so desperately hung on for a Pentium have been so excited about a 586? How would Bluetooth have fared as 'Short range connections that will never take off as much as everyone claims'? Would 3DMark be so popular if it simply threw a few thousand shapes onto the screen, rather than running dragon flights over medieval



This is the ax4spe, by AOpen. Not the catchiest of names, nor does it mean anything to the average man on the street, unlike obscure Greek myths!

villages, or setting airships against smoothly shaded sea serpents? Marketing may not play much part in making your computer work, but it's wrong to suggest that it doesn't matter. And at least 'AOpen Aeolus' is easier to remember than 'Graphics Card 32.4 (R1)'...

Win Microsoft Office Pro and a Shuttle PC!

PC Plus has teamed up with Microsoft and Shuttle to offer the writer of each month's Star Letter a copy of Microsoft Office Professional Edition 2003, worth £343, and a barebones Shuttle XPC ST20G5. Office is a complete personal and enterprise productivity solution that connects people, information and business processes. The Shuttle barebones PC is a small form factor system for high performance Athlon 64 processors.

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problem: one is to use an add-on WPA utility for Windows 2000, such as the one available for free download from www.wirelesssecuritycorp.com/wsc/public/WPAAssistant.do. I've found that this works OK except that it periodically loses the connection.

A second solution is to use a 'wireless Ethernet bridge' at the remote location, rather than a wireless adaptor dedicated to the PC. The bridge handles the WPA (or other chosen encryption) internally and provides a wired Ethernet output to which your devices can connect. These can be PCs, printers and storage – the devices don't have to support WPA or be aware that a wireless link is in use, as all they see is a wired Ethernet connection.

Tom Brett

Travelling light

I'm an enthusiastic reader of your magazine and a self confessed PC/

gadget/wireless junkie. I have dozens of gadgets, but I'm always looking for the ultimate in the smallest-one-device-does-it-all-tools, especially as I travel a lot by air. I find myself travelling with a large quantity of hardware, including electric shaver, electric toothbrush, laptop, tri-band/GPRS/PDA mobile phone, digital SLR camera, mini fridge ... all to ensure that I can always get my daily gadget fix.

This adds up to about 15Kg or more of kit and means that I can pack very few clothes if I want to keep within my luggage allowance. Due to the delicate and expensive nature of my gadgets, I have to conceal most of them in my carry-on luggage, in various plastic bags, or under a large coat so as not to hint that I may be over my baggage weight allowance.

I look forward to the day when there's one device standard for power supplies, chargers, cables and batteries, all connectivity will be wireless and the various functionalities are combined in fewer (or even one) device with the size and weight of gadgets significantly reduced.

With this in mind, I've been considering the latest HP PDA, the HX4700, as it has a high-resolution screen, integrated wireless and Bluetooth and can handle up to 4GB of memory with cards. However, it's not a mobile phone, so it fails to satisfy all my needs. What is the PC Plus recommendation on these devices for the traveller?

It occurs to me that if I could get a Bluetooth-to-Wi-Fi adaptor (standalone), then I could do 80 per cent of what I need to do on the move within one device: my mobile. The Wi-Fi would enable Internet browsing at hotspots and, presumably, some form of Skype application could be on hand to offer cheap calls rather than stupidly

expensive GSM rates. Mobile phone operators take note: I hate you.

The problem is, I've not been able to find a standalone Bluetooth-to-Wi-Fi adaptor. Do you know of one? Do you know of any Pocket PCs that have the screen, power and all-in-one functionality to enable me to travel as 'light' as possible?

Graham Walburgh

Labs Editor, Alan Dexter, replies: Go to any electronics show and you'll find that you're not alone in your quest for the Swiss-army knife of electronic gadgetry, Graham. Convergence has been a buzzword in just about every area of computing for quite some time now, and we're finally starting to see well thought-out and actually fairly useful products seeing commercial release. Mobile phones that boast high-resolution built-in cameras are the norm, with MP3 playback and video recording quickly becoming the standard, too.

While we can certainly see where you're coming from, your quest for a Bluetooth-to-Wi-Fi converter is unlikely to bear fruit. While the two standards appear to cover similar areas of communication – and indeed use the 2.4GHz frequency – they're actually designed for completely different things. Wi-Fi is a general network standard, while Bluetooth has been developed for communications between consumer devices.

Your best option here is to purchase a Smartphone that has Bluetooth as standard, and then upgrade it using a Wi-Fi SD card to cover both networking standards. The i-mate JAM, which picked up a Performance award in issue 226, would be a great starting point for such a device. **PCP**

Get started with Asterisk

PROJECT TIME



2 HRS 00 MINS

SKILL LEVEL



8 ADVANCED
We're setting up a whole
telephone network

YOU'LL NEED THIS



A Linux system

Jump into the exciting world of low-cost voice services with expert **David Coulson**, and the popular Asterisk PBX system

Asterisk is an Open Source PBX, which has extensive voice and VoIP features. While Asterisk was developed for use with VoIP, and has support for a wide range of VoIP protocols, it is perfectly possible to use it as a drop-in PBX replacement without any VoIP capabilities on the system. Unfortunately, this is boring. And anyone who likes expensive Telco loop charges, and obscene long distance and international pricing, is more than welcome to build this themselves. (Asterisk was initially developed by Mark Spencer, the founder of Digium (www.digium.com), which continues to be the primary supporter of Asterisk development, as well as a supplier of the hardware).

1 VoIP network needs We're going to look at setting up Asterisk on a Linux system using pure IP for transport. This is a great first step, as no hardware or telephony infrastructure is required, yet it gives us a real world example of VoIP. As one would expect, a public Internet connection is required if any outbound calls are to be originated from the network, although provisioning and configuration of such a service is outside the scope of this article. Ideally the Asterisk system needs a dedicated routable IP address, but you can get by with a non-routable IP address behind a firewall performing NAT.

2 Getting wild Most distributions, including Fedora Core and Debian have binary packages available for Asterisk, as well as the kernel modules and support libraries required. Unless voice hardware is being used to connect to a telephone network, the kernel-level support is not required. Debian users can simply 'apt-get install asterisk' to download and install the Asterisk system, or you can download the source code from www.asterisk.org.

Compiling Asterisk is very simple, although it does require compilation of 'libpri' and 'zaptel' for headers. Each of these can be installed with a standard 'make && make install' command as root, and the standard builds of each will be

sufficient for most tasks. Asterisk does take a short while to compile, but once installed it will use some default configuration files shipped with the packages.

3 Booting our PBX We can test out our Asterisk install by running the following command as root:

```
# asterisk -cvvvvv
```

As each module loads, lots of start-up information will fly by on the screen, but eventually we'll be presented with a simple looking prompt through which we can manage our Asterisk system.

```
Asterisk Ready.
```

```
*CLI>
```

The Asterisk command line is very much like that of Cisco IOS, so if you're familiar with the popular router software you'll be able to find your way around very quickly. The 'show version' gives us the current version of Asterisk running, and all of the commands can be reviewed by typing '?' at the CLI prompt. One of the most useful initial commands is 'show modules', which displays all the modules that are part of the Asterisk suite. Each capability of Asterisk, such as telephony protocol provisions, codecs for audio compression and the various applications that are installed as default, are shown as modules in Asterisk.

4 VoIP protocols During the installation, Asterisk will set up a number of default SIP and IAX connections, which can be used for testing, or for base configuration. We can review the 'SIP' users that are currently connected, if there are any, with 'sip show users' at the CLI:

```
shuttle*CLI> sip show peers
```

Name/username	Host	Dyn	Nat	ACL	Mask
Port	Status				
mheap/mheap	(Unspecified)	D			
255.255.255.255	0	Unmonitored			
home/home	10.2.3.130	D			
255.255.255.255	5060	Unmonitored			
david-11/david-	10.2.3.130	D			
255.255.255.255	5060	Unmonitored			
dcoulson/dcoulson	10.2.3.149	D			
255.255.255.255	5060	Unmonitored			
4 sip peers loaded [3 online , 1 offline]					

As we add SIP clients, or configure outbound SIP connections for delivering voice calls, this list will change and we can review what is actually connected to our Asterisk system. Whenever we change the configuration, we can run 'reload' from the command line, which will reload our Asterisk configuration and modules without dropping any existing

```
[From-iax]
exten => 996,1,Dial(IAX2/guest@66.250.68.134/996
exten => .9011,,1,SetCallerID(2169203100)
exten => .9011,,2,Dial(IAX2/dcoulson@Nufone/${EXTEN:1},100,Tr)
exten => .9011,,3,Congestion
exten => .9011,,103,Congestion

exten => .011,,1,SetCallerID(2169203100)
exten => .011,,2,Dial(IAX2/dcoulson@Nufone/${EXTEN:1},100,Tr)
exten => .011,,3,Congestion
exten => .9011,,103,Congestion

exten => .9N000000,1,SetCallerID(2169203100)
exten => .9N000000,2,Dial(IAX2/dcoulson@N2net/2169${EXTEN:13},100,Tr)
exten => .9N000000,3,Congestion
exten => .9N000000,103,Congestion
exten => .91216N000000,1,SetCallerID(2169203100)
exten => .91216N000000,2,Dial(IAX2/dcoulson@N2net/${EXTEN:23},100,Tr)
exten => .91216N000000,3,Congestion
exten => .91216N000000,103,Congestion
exten => .91440N000000,1,SetCallerID(2169203100)
exten => .91440N000000,2,Dial(IAX2/dcoulson@N2net/${EXTEN:23})
exten => .91440N000000,3,Congestion
```

Extensions are defined using a combination of wildcards and static assignments, allowing for flexible dial plans.



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David is a Linux consultant who specialises in network architecture and system management

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Firefly is one of the many available IAX2 based soft phones, which can turn a Windows system into a phone.

calls. Of course, if we break the configuration and impact the routing of connections then new calls won't work very well.

5 Take a SIP The first step for outbound calls is to configure a SIP user and connect a phone to our Asterisk system. Without spending any money on a real phone, we can use one of the many soft phones that are available on the Internet, which support SIP (<http://freshmeat.net>). Windows users can try X-Lite (www.xten.com), which is another great free SIP phone. We configure SIP users in `/etc/asterisk/sip.conf`, and a standard SIP configuration should look something like this:

```
[general]
port = 5060
bindaddr = 0.0.0.0
musiconhold=default

[david-11]
type=friend
username=david-11
secret=PASSWORD
host=dynamic
canreinvite=yes
context=default
callerid="David Coulson" <100>
mailbox=100
```

The above SIP configuration is fairly simple, but it has all of the basic configuration entries that we would require for most clients. Once our SIP client has authenticated against our Asterisk system, we can call out on Digium 'demo' extension. Just dial '500' and we should get a voice telling us we are connecting to Digium, followed by their IVR system. If extension '500' fails, checking the Asterisk console will give some cryptic information to aid in debugging the problem. However, as the outbound connection to Digium is using IAX, it should work on any network.

6 My extension is ... Configuring an extension to call our SIP phone is done through `/etc/asterisk/extensions.conf`, and we can add a '100' extension to the 'default' context. The `extensions.conf` file is split into numerous contexts, so depending upon how the call comes in, or how we choose to route the call, various contexts are used. Within contexts, ➔

PASSING SHOT

Asterisk was named after the '*' character in UNIX, which means 'anything and everything'. The slogan 'any call, any time, from anywhere to anywhere' sums up the desires of the Asterisk project. Asterisk is designed to be able to transparently handle calls in, out and through the PBX, without the user even knowing if it's going out through VoIP or a standard telephone line. Likewise, inbound callers needn't know where the call is picked up. Being a little cheaper than a £15,000 PBX does help Asterisk to be more cost effective for a small business, or home, user to install, as well as offering some extreme flexibility when you are looking at managing voice communications.

VoIP terminology

If you don't know your IAX from your G.711, here's the place to start

E1

Trunk circuit used in Europe, built from 32 64k channels. E1 may provide pure PSTN signalling, or more complex ISDN services.

Foreign eXchange Office (FXO) interface

Interface used to connect to local telephone companies through a standard PSTN line. Called FXO, as you connect to carrier's Central Office (CO).

Foreign eXchange Station (FXS) Interface

Used to connect standard telephone handsets, as they are considered 'Stations'. An FXS interface is what your telephone company provides you with through the wall outlet.

G.711

The standard audio encoding that is used by telephone companies for digital signal transmission. In the US, G.711 ulaw is used, but in Europe G.711 alaw is used instead.

G.729

A low bandwidth patented codec. Using G.729, we can deliver VoIP calls over a 56k modem.

H.323

An older protocol used for voice communications. Most devices that used H.323 now use SIP instead.

Inter-Asterisk eXchange (IAX)

An open VoIP protocol from Digium, the primary developer of Asterisk, designed for reliable connectivity of voice calls over IP. IAX is great for trunking calls between VoIP carriers and a local system, or between two Asterisk boxes, as it works completely transparently through NAT.

Integrated Services Digital Network

The standard for delivering digital voice circuits to consumers. ISDN Basic Rate Interface (BRI) consists of two 64k channels for voice and data, and one 16k data channel for signalling. ISDN can also be delivered over T1 or E1 for 23 and 31 channels

respectively, and one 64k channel for signalling, which is known as Primary Rate Interface (PRI).

Realtime Transmission Protocol (RTP)

A protocol delivered over UDP providing real-time data communications over IP. RTP is used by both SIP and H.323 for the voice streams.

Session Initiation Protocol (SIP)

A popular VoIP protocol used by telephones and VoIP carriers alike.

T1

Trunk circuit used in the US for voice or data transmission. T1 consists of 24 64k channels used for inbound or outbound calls. Alternatively, ISDN PRI can be delivered over T1 for 23 voice channels.

VoIP

A generic term referring to the delivery of voice over the IP protocol. SIP, H.323 and IAX are methods of provisioning VoIP services. ■

Community support

Get on the Asterisk mailing list and dive in

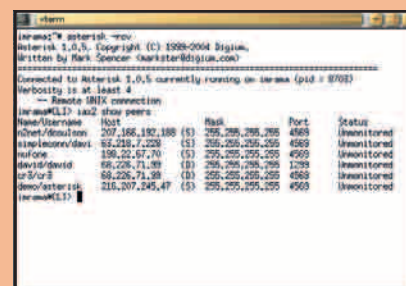
Building an Asterisk system is a complex business, and building it out with voicemail, interactive voice response (IVR) capabilities, as well as being able to reliably handle calls is quite a challenge.

However, we can start out with a very simple call router, and add in additional capabilities

as we need them. For small to medium-sized businesses,

Asterisk is a great choice when considering phone facilities, and is used by thousands of existing installations as a production telephone system. As with other open source projects, Asterisk has very active mailing lists, as

well as IRC channels, which are great resources for new users or even experienced administrators who need complex questions answered. For production environments, Digium offer consulting services, which for a larger job is a great way to make sure everything is working.



Building an Asterisk system can be a challenging project, but like most open source projects, there's an active community surrounding it.

GOING FURTHER

Here are some sites that can help you make connections:

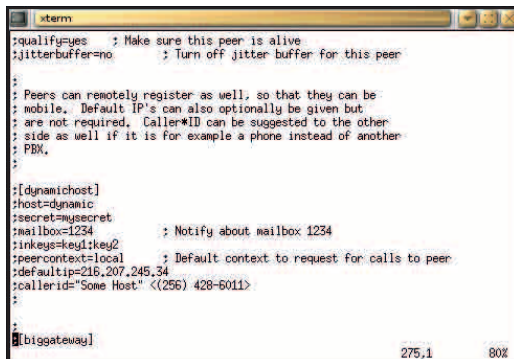
Gossiptel
www.gossiptel.co.uk
 Gradwell.net
www.gradwell.net
 NuFone
www.nufone.net
 SimpleTelecom
www.simpletelecom.com
 VoIPUser
www.voipuser.org.uk

There are also a number of community projects which can't actually route calls onto the public network, however they're great for connecting to other users on the Internet who have VoIP systems:
 FreeWorldDialup
www.freeworlddialup.net
 IAXTel
www.iaxtel.com

Lots more information on VoIP providers can be found at
www.voip-info.org/wiki-VOIP+Service+Providers/.

NEXT MONTH

Next month we will expand our Asterisk installation with voice applications.



IAX2 is a protocol to deliver VoIP calls, and works really well through firewalls and restricted networks.

extensions are defined as lists of priorities, with each being called in turn until we either get to the end, or one of the calls jumps us to a different priority. Our extension '100' configuration would look something like the following:

```
[default]
exten => 100,1,Dial(SIP/david-11,20,Ttr)
exten => 100,2,VoiceMail(u100)
exten => 100,3,Hangup()
exten => 100,102,VoiceMail(b100)
exten => 100,103,Hangup()
```

It really doesn't get much simpler. We try to call our 'david-11' SIP user for 20 seconds, and if no one answers we jump to voicemail box 100 using the 'unavailable' announcement. Should the 'david-11' user be busy, we use the 'busy' announcement. With two SIP handsets we should now be able to call in and out to each of them without any difficulty. Things get more complicated when moving the IAX protocol. But now that we've set up one basic system, it shouldn't be difficult to transpose the techniques across. Before long, you should be ready to make calls anywhere, for free.

Using IAX The IAX2 protocol is used by a number of VoIP carriers, and it'll jump through a single firewall port. We're going to set up Asterisk using 'NuFone', a Michigan-based telephone company who provide low-cost US call termination worldwide. Depending upon your location, a variety of VoIP carriers can be used to drop calls onto, and you can have as many connections to carriers as you want.

We start by adding entries to /etc/asterisk/iax.conf for NuFone and register ourselves with their server. Registration avoids needing a carrier to statically configure our IP address, as our Asterisk system will simply tell the remote end what our current IP address is as part of the IAX2 session.

```
[general]
port=5036
register => USER:PASSWORD@gw-sfld.nufone.net
[NuFone]
host=switch-2.nufone.net
type=peer
secret=PASSWORD
```

We can verify that the above is functional by doing 'iax2 show registry' and 'iax2 show peers' from the command line. To originate US-formatted calls onto NuFone, we can add a few entries to /etc/asterisk/extensions.conf, within the 'default' context and tell it where we want our calls to go:

```
exten => _91NXXNXXXXXX,1,SetCallerID(216920310)
exten => _91NXXNXXXXXX,2,Dial(IAX2/dcoulson@NuFone/${EXTEN:1})
exten => _91NXXNXXXXXX,3,Congestion
exten => _900,1,SetCallerID(216920310)
exten => _900,2,Dial(IAX2/dcoulson@NuFone/${EXTEN:2})
exten => _900,3,Congestion=
```

NuFone also offers origination of international calls to users on a pre-paid pricing scheme, so we can add entries for these calls if we want to permit international calling. **PCP**



X-lite is another free soft phone, using SIP. It'll require some creative networking if you have a complex firewall.

VoIP handsets

For pure VoIP, using an IP handset is the only way to go

In our opinion, the Cisco 7900 series of phones are, without a doubt, the best choice for a desk. While the mid-range 7940 and 7960 phones cost around \$300 (approximately £200) from eBay, they are comparable to a similarly priced executive desk phone. They both have a very good speakerphone, which is rare on even expensive telephones, as well as a nice big LCD screen. Cisco also offer a 7912G phone, which can be used with SIP, although the reduction in features versus the 7940/7960 phones, and next to no reduction in price, limits the overall appeal of this phone.

Of course, £200 is a lot for a phone, and there are a number of cheaper options. Grandstream offer a 'Budgetone' phone for less than £75, which has basic features and not much more. For a home user, this is a great way to get into VoIP without spending too much money, but don't expect it to stand up to a beating.

There are also a number of devices that provide an FXS port for connection to a standard telephone device. The best known is the Cisco ATA186. Many router manufacturers, including Linksys and Morotola, offer similar products

which can be added to an existing Ethernet network. All of these use SIP, which makes them ideal for use on an internal network but can cause problems when used behind NAT on a private network.

Digium offer a device known as an 'IAXy', which gives a single FXS port for a phone, and talks IAX back to an Asterisk server. These devices work behind pretty much any firewall, and even within a very restricted network. With a wireless bridge, you could even head down to the local shopping centre and make cheap calls. ■

The one true text editor

PROJECT TIME



1 HR 00 MINS

SKILL LEVEL



5 INTERMEDIATE
Initially straightforward, but it'll meld your mind

YOU'LL NEED THIS



Linux, Emacs and patience



<http://forum.pcplus.co.uk>

In this introduction to text editor Emacs, **Paul Hudson** exposes us to shortcut chords, and explains the art of mastering them...

For many years, people have argued over whether the M25 motorway circles London, or whether it is London that circles the M25. This is a difficult question indeed, but here's an even more difficult one: which OS do you use? As this is a Linux tutorial, chances are you answered "Linux" without batting your eyelids, or perhaps in a fit of Stallman-esque Free Software frenzy you answered "GNU/Linux".

This is probably true. However, this month you are going to learn about the biggest application in all of Linux. This is a program that most say achieved full operating system status years ago, and is already well ahead in its plans for world domination. Yes, ladies and gentlemen, this month we are covering Emacs.

1 It's better with Meta Emacs is the elite hacker's text editor of choice, partly because it is so flexible that you truly can spend your entire working life without straying outside of it, but also because it has a steep learning curve that gives you boasting rights over fellow geeks.

To get started, type 'emacs' from your terminal. If you are running X, this will automatically open a graphical version of Emacs, which lets you use your mouse for extra control. If you are running without X, this will open the terminal version of Emacs; you can also get here from within X by running 'emacs -nw'. Using the X version of Emacs is recommended until you get on your feet, at which point you can pick and choose what suits you best.

Emacs makes extensive use of keyboard shortcuts, but you can work with the mouse too. The short control keys are 'Control' and 'Alt' (usually referred to as 'Meta'). For example, pressing 'Ctrl-x' then 'Ctrl-c' is the command to quit Emacs – you need to press and hold 'Control', then press 'X', then press 'C'. Using two keys together like this is called a shortcut 'chord' and is used often in Emacs – so often, in fact, that the 'Ctrl' and 'Meta' keys are usually referred to as just 'C' and

named because files, once opened, are referred to as 'buffers'. Alternatively, you can type 'C-x b' (that is, press and hold 'Ctrl', then press 'X', then release both keys and press 'B' by itself), then type the name of the file you want to switch to (without the path). Emacs will prompt you with a default option, which will be the previous buffer you looked at – hit 'Enter' to use its default. Once you have files open, you can just type normally to edit the text, then save with 'C-x C-s'.

2 Search and replace The basic search and replace command in Emacs is activated with 'C-s', and then by typing what you want to search for. This searches forwards only. To search backwards, use 'C-r'. To repeat the search, just type the command twice, so 'C-s C-s' or 'C-r C-r'.

That's the easy part over with, because search and replace requires the Meta key. To run a simple replace command, press 'M-x' (hold down 'Alt' then press 'X'), type 'replace-string' and hit 'Enter'. Emacs will prompt you for the string to search for (hit 'Enter' again after typing it in), then it will prompt you for the string to replace it with (again, hit 'Enter' when you've typed it in). This runs a 'replace all' search, with no further input from you. If you want more control, try 'M-x query-replace', which prompts you for the search string and the replace string as before, but then asks you to confirm each change it finds – press 'y' to accept a change, or 'n' to reject.

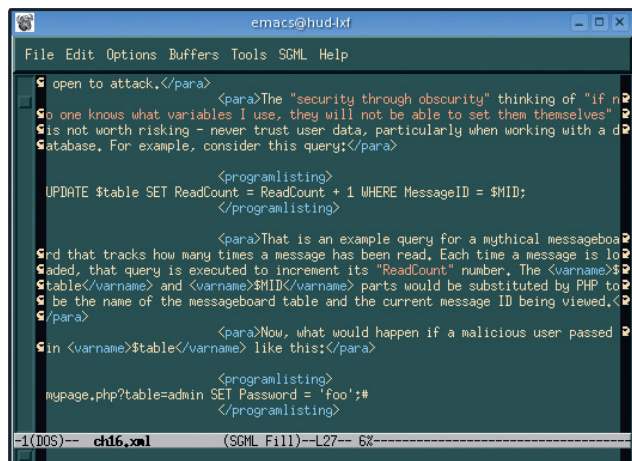
If you're feeling clever, you can use the shortcut to the shortcut (do you see why Emacs is so hard now?), by typing 'M-%' to run a query replace. In practice, the '%' sign is reached by holding down 'Shift' and pressing '5', so you need to hold down 'Alt', hold down 'Shift' and press 5.

If you make a change with your search and replace (all too often we've used 'replace-string' when we really meant 'query-replace'), you can undo your last action with 'C-x u'. An 'action' is one complete change, which means one change if you used 'query-replace', or many changes if you used 'replace-string'. Alternatively, there is an Undo menu item under the Edit menu, along with various search and replace items, which mean you needn't worry too much about the shortcuts if you really don't want to!

3 Cut, copy, and paste As you are learning with the X version of Emacs, all three of these operations can be performed using the mouse. As with other text editors, you can just select text and use either Cut, Copy, or Paste from the Edit menu. Of course, if you want to learn Emacs properly, you need to learn the shortcuts. And this is made more complicated by the fact that, because Emacs works in a console, you need to be able to select text without a mouse.

The first thing to do is position the cursor where you want to start copying. Now press 'C-space', space being the Spacebar on your keyboard. Moving the cursor now will highlight characters in blue, showing you your selection. When you have the text you want, press 'M-w' to copy the

Emacs in X works with a mouse, so you focus less on learning keyboard shortcuts and more on simply getting your work done.





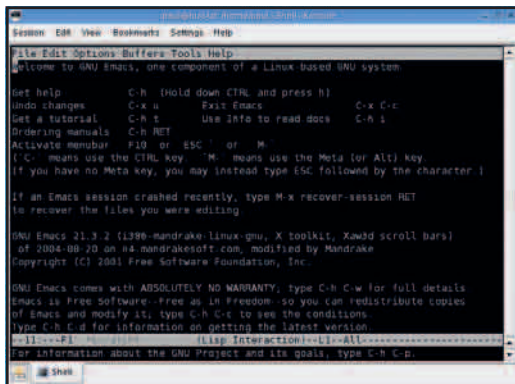
Paul Hudson

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Coding specialist and Linux evangelist, Paul handles reviews for sister magazine Linux Format

PCPlus Back Issues

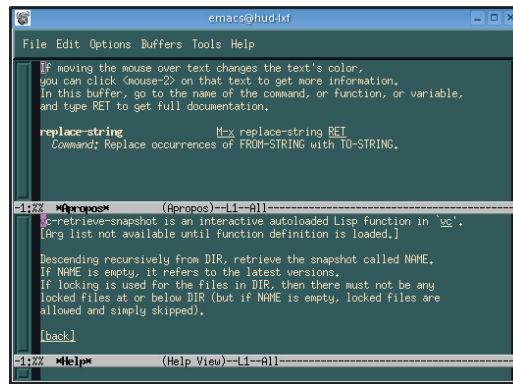
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When running from the shell, Emacs runs in classic mode. It looks similar but, trust us, the guru kudos rating is much higher!

text to the clipboard, or use 'C-w' to cut the text to the clipboard (so you copy it, then delete it). Now position the cursor where you want to paste, and press 'C-y' for 'paste', which is short for 'yank'. Cunningly, the word 'yank' means 'paste' in Emacs, but 'copy' in Vim – isn't choice great?

The help files The help files for Emacs are built into the editor, and you can access them either through the menu bar or through yet more shortcuts. Fortunately, for all of us, the help files uniformly consist of the shortcut 'C-h' and another key. If you have it installed, the best place to start is at the Emacs tutorial ('C-h t'). It gives lots of text examples to get you into the Emacs frame of mind. If you're already working smoothly, the Emacs FAQ ('C-h F') will be a better place to start as it loads the info page up with questions about general use. Given that Emacs has been around for a



'C-h' is the gateway to get to the Emacs help, but, call us lazy, it's much easier if you just use the Help menu.

long time, lots of questions have been asked. So you should almost certainly be able to find your answer here!

There are a few commands that bring up information on Emacs commands and usage. For example, 'C-h a' lets you enter an Emacs command to find out what it does. So 'C-h a' then 'replace-string' and 'Enter' will tell you that the replace-string function finds and replaces text. You can get information on commands by using 'C-h c', which prompts you to enter another command. For example, 'C-h c' then 'C-h a' prints 'C-h a runs the command apropos-command'.

One final command that may be of use is 'C-h b', which lists all the keystrokes currently assigned to an action, as well as what they do (there are quite a few of these). You can get information on what each command does by moving the cursor, with your keys or the mouse, over the underlined command name, and hitting 'Enter'. **PCP**

GOING FURTHER

This has only been a brief introduction to Emacs – there's a whole world out there for you to experiment with. If you're a programmer, the version control subsystem is ideal to check out work and keep track of changes, but you can also compile, patch, diff, and debug, all from inside the editor (see the Tools menu for more). For general users, try reading your email with Emacs. It can check POP3 boxes and send responses using Sendmail. Alternatively, you can read and post to Usenet using the Gnus plug-in. As always, the best place to start is the Emacs documentation. There is a lot of it, but it should guide you through even advanced tasks.

NEXT MONTH

Has Viper mode given you a taste for uncomplicated text editing? Next month we pull back the veil on Vim.

Emacs, the kitchen sink

Stressed out by shortcuts? Speak to the psychiatrist!

When I said that Emacs is considered an OS by many, I meant it. Just a brief scan around some of the menu items should have shown you how much there is to offer. Emacs' flexibility is possible because it has the Lisp programming language deeply embedded inside it, and so people are free to create very complex add-ons for it.

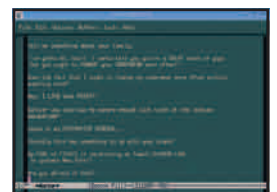
For example, under the Tools menu you'll see controls to read Usenet and email, apply patches and compare files, run debuggers and play games. The games are marvellously simple – Snake, Tetris and Adventure (a text-based RPG), being some on offer. But, perhaps the most interesting of all is the Emacs psychiatrist, which is (tellingly) located under the Help menu. Here you

can offload your emotions, rationalise your fears, and plead your beliefs while the Emacs doctor pretends to be listening to you. Just don't come to it with high expectations! A much more interesting diversion is pressing 'M-x' then running psychoanalyze-pinhead, which uses quotes from Zippy the Pinhead input for Emacs' psychiatrist – just hit 'C-c' to stop the madness.

Emacs has something for everyone. For example, if you spent the few years of your Linux life learning the Vim editor (don't worry – we all make mistakes!), you can transfer that learning to Emacs through 'Viper' mode. 'Viper' stands for 'Viper Is a Package for Emacs Rebels', making it clear that although Vim users and Emacs users strongly disagree

about choice of editor, there is at least some cross over.

Type 'M-x viper-mode' to enable Viper mode. Emacs will ask if you want to suppress the start-up message (type 'no' so that you see the info screen each time), then Viper will prompt you for a 'Viper level'. Put simply, Viper level 1 works almost exactly like Vim, level 2 adds a few Emacs features, level 3 adds more, level 4 is starting to feel half like Emacs, and level 5 is an equal blend of both Vim and Emacs. Start with level 1 if you value your sanity. We recommend you don't make the change permanent, so that you can easily select other levels as your competency improves. Once in Viper mode, hit 'Escape', then press 'q' to quit, as in Vim. ■



The Emacs doctor at work... and the diagnosis is dire! The patient (Zippy the Pinhead) is probably beyond hope.

This Series	Part One	Part Two
Marketing	Direct mail and email advertising	Working with marketing agencies

Marketing agencies

PROJECT TIME



1 HR 30 MINS

SKILL LEVEL



2 BEGINNER

If you're looking to promote your company you can benefit from this

YOU'LL NEED THIS



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<http://forum.pcplus.co.uk>

You may have never thought of bringing in a PR agency to help you advertise but, as **Matt Haig** shows, it doesn't have to cost the earth

The Institute of Public Relations defines PR as 'the discipline which looks after reputation, with the aim of earning understanding and support, and influencing opinion and behaviour'. The press release is the quintessential tool for handling this. Put simply, a press release is a news story sent out to journalists and, if relevant, financial market analysts and research companies that cover your industry. A release always begins with a news-style headline, and ends with key details about your company.

What goes in the middle can be anything from your reaction to winning an industry award, to announcing the results of a survey that your company has commissioned. But, crucially, the subject has got to be newsworthy. A lot of companies will be fighting for the same column inches, and your story just won't get written about if it's not interesting enough.

1 Hold the front page The headline should be straightforward, and to the point. Like a newspaper story itself, the press release should ultimately answer the key questions who, why, where, when and how. A great overview can be found at www.pr4everyone.com. Keep the reader firmly in mind both when you are writing your press release, and when you are deciding who to mail it to.

You might find the media directory BRAD (www.intelligencia.com) helpful in identifying publications that are likely to pick up on your news. Research TV and radio as well, considering the additional time element that they entail. Magazines have much longer lead times than online newspapers, for example.

Once you've sent your press release, you must ensure that you have a spokesperson on hand to field any press queries. Helen Baynard, business development director at the PR agency Johnson King says, "The best efforts of agencies or PR people can be thwarted when the spokespersons are unwilling to speak to the press, or not fast enough to respond to opportunities."

2 Statement of intent Of course, press releases aren't your only PR option. Between May and September 2003, BT Wholesale drove grassroots demand for broadband by staging a challenge. They asked people to tell BT about innovative things they were doing with the technology. The campaign was publicised with press releases, case studies, photography and events. Ultimately it gained BT over 200 pieces of media coverage, many being at grassroots level through local papers and radio stations.

You could also pitch yourself or your company as an industry expert, as Green



Be on the lookout for new opportunities. Profnet (www.profnet.com) makes you available to give quotes to journalists.

Flag Motoring did when it launched its 'Mobile Phone Use Behind The Wheel' campaign. Individually, you or a colleague could write articles for magazines or websites that promote your company in the byline, or become brand ambassadors through speaking at conferences.

3 Hiring outside help Of course, PR agencies are the professionals who are paid to dream up such initiatives, as the above, for you. By dint of it being what they do all day, they have invaluable media contacts, know what does and doesn't work, and can put their talents to work making your news all the more credible.

If you do decide to use an expert to help market your product, you'll have to decide whether you require a retained agency, who you'll then work with over a long period of time, paying them a monthly fee, or whether you are going to work with one for an individual, one-off project. When a PR agency is working on a retainer, they commit to carrying out a range of PR activities on your behalf. These might include crafting case studies that involve your company, or briefing staff members on newsworthy topics and telling the press that they're free to comment.

According to Monique Chambers, owner of PR agency Compass Rose, a typical retainer would consist of the following: one major press release every month; one case study every two months; press days, when journalists are invited to meet you or your colleagues, every three months; commentators ready to react to market trends; features; award and event research; recommendation and management. For this amount of work, you can expect to pay a minimum of £3,000 per month.

The agency cost for a one-off PR campaign can range from a couple of hundred pounds for distributing a news story, to a few thousand pounds for a large scale campaign and press conference. Whichever approach you choose, work is rarely paid for up-front, so watch out for hidden charges being added to your bill. You can even ask the agency to set a budget for costs such as stationery and telephone calls.

www.pr4everyone.com is a decent free site for finding the truth behind the techniques, or for hooking up with an agency.





Matt Haig
pcplus@futurenet.co.uk

An expert on marketing techniques, Matt provided plenty of advice in our sister magazine Internet Works. But please, don't send him your ads

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They are loads of PR agencies around, so make sure you're hiring experts. Check out what previous work they've done.

4 Searching for a star If you do decide to use an agency, a good place to start looking for one is the Institute of Public Relations website (www.ipr.org.uk). Its PR Matchmaker service costs £60 and, as its name suggests, matches up your requirements with consultants. Experts always warn that you should check exactly who you're going to be working with before committing to an agency. "Make sure you ask (them) to bring the team that will be working on your campaign, not the business development person who you will never see again," warns Kathryn Goodall, account director at Marketforce.

As is so often the case, by far the best way to find an agency is via personal recommendation. Ninety per cent of prospective enquires to PR agency Brazil, to give just one example, come from customer referrals.

5 Self starter Of course, nobody knows your business as well as you do, and going it alone is certainly the cheapest option that's available to you. Compared with advertising, basic PR requires few resources. You don't even need graphic

designers or multimedia whizzes to make a good impression. The only catch is that you'll need to provide all of your own materials, from case studies to contacts. FeaturesExec (www.featuresexec.com) caters for the technology and finance industry, and provides editorial contacts and information on what publications are planning to write about for a fee of around £1,500 a year. Another way to find out about forthcoming articles is to subscribe to services that send journalist requests for information direct to your mailbox. One such service is ResponseSource (www.responsesource.com). It costs £125 to £225 per year.

Ensure that any statements you make are factual, and not misleading, before sending them out to the press. If you're not the leader in your field, don't say that you are. There are codes of practice set out by organisations like the IPR, which are worth looking at. Nick Hall, owner of Hall Communications (www.hallcommunications.co.uk) goes as far as to recommend approving documents with your lawyer or legal department prior to sending them out. If only "to ensure no negative coverage can result from statements".

6 Measuring success Even if your campaign scores you media coverage, the more intangible goals of PR, such as an enhanced reputation and increased market awareness, are tough to measure. If you're working with an agency, it will undoubtedly employ a press cuttings specialist whose staff scours thousands of media sources every day for a mention of your company. One cheap alternative is Durrants (www.durrants.co.uk). Another way to track your campaign is to do so online. Run a search on Google and look for mentions of your company, or examine your web server statistics to see where visitors have clicked through from.

Ultimately, PR is trial and error. You can only find out what works by doing it. But, as the amount of media continues to grow, so do the campaign possibilities. The media changes, but the general principles of PR remain the same. **PCP**

PASSING SHOT

Press release pros and cons

PRO: Cost
If it succeeds, it's a cheap way to attract a huge audience.

PRO: Influence
When spoken by a journalist, your words have an extra endorsement.

PRO: Visibility
Customers and clients will gravitate towards companies with consistent visibility.

CON: Slow
You may need to send out several releases just to make a publication aware of you.

CON: Time consuming
You'll have to be ready to talk to the press.

CON: Lack of control
You have no say over how much coverage your campaign will achieve.

Entering the big league

Taking your message to the TV and radio is possible, but don't expect it to be cheap

Ever since Kraft pioneered the use of TV advertising in the 1940s, marketers have seen the television set as the ultimate doorway to potential customers. In a country like the UK, where eight out of ten people watch it on a daily basis, there are clear advertising benefits. Agencies will help you target a particular audience profile by tapping into their sophisticated data on TV habits, and their specialist media buyers will negotiate a slot on your behalf. Of course, the drawback is the cost. A 30 second slot during Coronation Street costs thousands of pounds, and that's without taking into account the production costs. Admittedly these may

not be as much as the \$10million that Apple forked out for its 1984-inspired commercial for the launch of the original Mac, which was directed by Sir Ridley Scott, but you can guarantee that they'll be substantial nonetheless.

Radio advertising can be much more effective. In any given month, 80 per cent of 15 to 44 year-olds listen to local, national or commercial radio, according to the Advertising Association. It's most popular, and therefore most expensive, outside peak TV viewing hours, which revolve around the breakfast and drivetime periods. Radio listeners are widely considered to be the most loyal of all media users, as they tend to stay

with the same stations and programs. Again, it all comes down to targeting your audience. Costs are more modest, and a campaign with Yorkshire's Radio Aire station would cost between £3000 and £6000 a week.

Because there's no opportunity to get a visual identity across on radio, the script of your ad needs to be catchy, memorable and repeated. You'll have to find the right voice and music for the ad, record it, find the right radio station and finally buy the space. To get all this done, you'll probably require professional help. For more information, visit the Radio Advertising Bureau at www.rab.co.uk. ■



Throwing ideas around is a waste of money. Get the expert opinion on what works before committing yourself.

This Series	Part One	Part Two	Part Three	Part Four	Part Five
Learning programming with Perl	Getting started: variable names and types	Regular expressions and strings	Control structures	Subroutines and passing variables	Input and output: files, consoles and sockets

Subroutines

PROJECT TIME



2 HRS 00 MINS

SKILL LEVEL



4 BEGINNER
Take each piece on its own and it's easy

YOU'LL NEED THIS



A working installation of Perl on Windows, Linux, *BSD or any other OS

Paul Grosse takes us into the underworld of subroutines, demonstrating how to simplify and reuse parts of your programs

If you have had a go at writing some programs of your own, you'll have probably discovered that, sometimes, you repeat the same pieces of code, or that your programs can sprawl over a number of editor-page-views. To make things worse, if you want to edit a piece of repeated code you need to find all instances of it. These factors make finding programming errors unnecessarily difficult, and your programs hard to read. This is where subroutines come into their own.

Subroutines can sound daunting but you will have already been using them, probably without even realising it. For example, every time you use the 'print' command you've been using a subroutine – although you never get to see its internal workings. 'Print', like many other commands, is effectively a 'black box' that does all of your printing work for you. You don't need to know how it does its job, just how to use it. Although it's early to spring a fundamental concept on you, the 'black box' is how programmers write large, complex programs, and how they can work on details within them.

1 First steps In reality, you take your problem and break it down into a few, overall steps. This might be as broad as: 'Initialise variables'; 'Get user input'; 'Process data'; 'Produce output'; and, 'Tidy up'. Note that there is no program code at this stage. Each of these steps, or 'black boxes', can be broken down into smaller levels of detail. So, if you take 'Get user input', you might want to check what the user is typing, or limit what they can input in some way, then pre-process it so that it's in a form that the program can use. This might consist of checking ranges of input, stuffing the entries into

an array in a particular way, or checking that an IP address exists and has a specified port open. Each of these processes can be broken down further until you have something that you can turn into program code, such as using regular expressions to check that a string contains only digits and then checking that it is within an expected range.

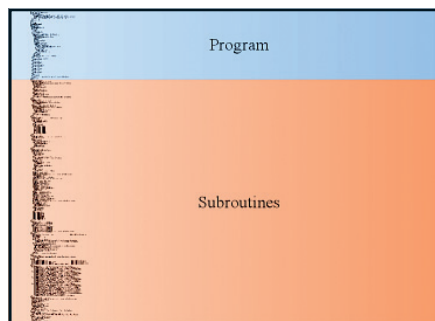
If you are writing a program of any size, which is anything other than the short, non-interactive, linear, 'do a specific job' type of program that tends to end up in schedulers such as your cron table file (/etc/crontab or similar), you will probably end up with a lengthy mass of code that can be difficult to check and edit. Remember that somebody else (such as a maintenance programmer) should be able to make sense of your code and, perhaps more importantly, you should be able to make sense of it after it's been written.

2 Reducing repetition If you find that you have to do a particular routine many times within a program, such as print in a particular format to a log file, you can make life a lot easier for yourself by giving that routine a place of its own and calling it when it is needed. This can be done using just a single command, in the same way that you do with 'chomp'. By doing this you can shorten the overall length of your program, and if you need to correct the code or edit it at a later date you only need to look in one place.

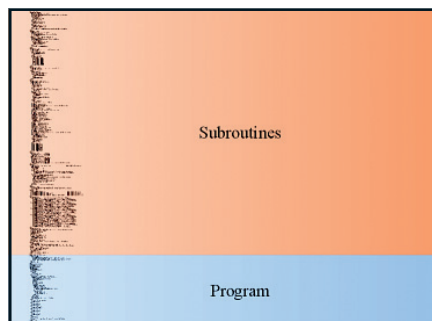
So, how do we write and use a subroutine? The content of a subroutine doesn't have to be different to the type of programming you do anywhere else in your program. But it does have to be surrounded by a special type of block that starts off with 'sub' and then has the name of your routine, which follows the same naming conventions as variables.

<http://forum.pcplus.co.uk>

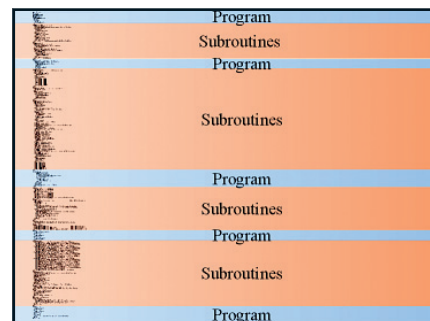
Placing subroutines in your program



1 Subroutine code is not run unless it is called by your program. As a result you can, theoretically, place it anywhere you like. In the example above, all of the main code is at the beginning, which makes it easy to see. You can also put an 'exit;' at the end of this block of code, which will prevent the execution of any stray lines of code.



2 Here, the subroutines are first. So, if your main program is fairly simple the subroutine you are currently working on can be at the beginning. The disadvantages are as follows: for users to alter configuration lines they have to go to almost the end of the program and, any odd lines of code will be executed before your main program even starts.



3 You might be confident enough with your programming to [dis]organise it like this, with bits of main code in amongst the subroutines, but don't expect anybody else to help you out or even maintain it for you once you have finished. It could end up like this if you just write as you go. Organising it in a better way is definitely worth the effort.



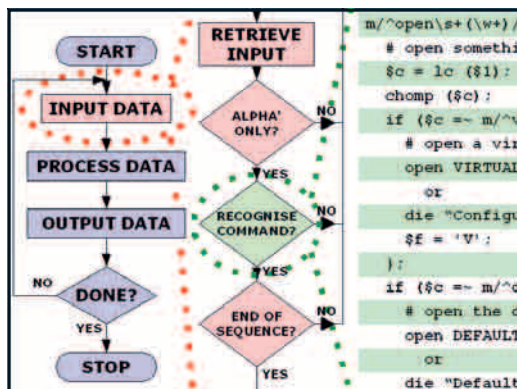
Paul Grosse

paul.grosse@futurenet.co.uk

Paul started helping people with their PC problems back in the 1980s and now programs in return for food

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Break down each element of the overall picture until you end up with your program. Frequent repeats can become subroutines.

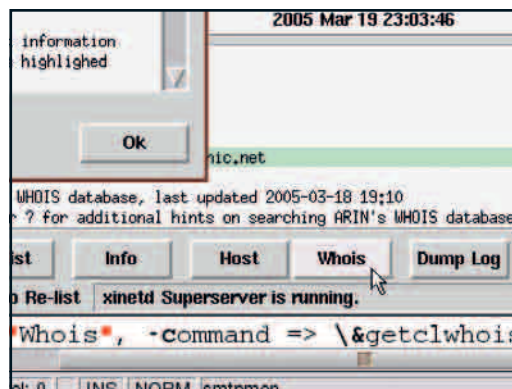
Following that, you have a block of code within a set of braces in the normal way.

To use such a subroutine, you just have to use an ampersand, followed by the name of the subroutine and the usual semicolon. So it might look like this:

```

($x, $y) = (2, 3);
&addy;
print "$z\n";
sub addxy {
    $z = $x + $y
}
  
```

Note that there's no need for a semicolon at the end of the subroutine block, and also that the last statement in the subroutine doesn't need one either. This little program assigns the values of '2' and '3' to two global variables, calls a subroutine called 'addy' and then prints the value of



Subroutines are all around you. In event-driven programs every button has a subroutine of some sort associated with it.

another global variable. On its own, this doesn't save us any code-writing but if this subroutine was a little longer, and we called it many times from different places within our program, it would save a lot of work and maintenance. One other point worthy of note at this stage is that the main program ends with the last, non-subroutine line of code. Hence it effectively ignores anything that is within a subroutine block. This means we can put the subroutines anywhere we like in our program and Perl will respect them.

Finally, just how much code needs to be repeated to justify turning it into a subroutine? The answer to that is largely a matter of opinion, but a rough guide is that if you have code repeating more than two or three times, and it is more than four or five statement-lines long, you could justify turning it into a subroutine. I recently saw code from a company that should have known better (it wasn't written in Perl) that used subroutines with only two lines of code, making things harder to read, rather than easier.

PASSING SHOT

In the various Unices, running a Perl program called 'prog' from the command line is simply a matter of going into the program's directory and typing './prog'. In Windows, double-clicking on the Perl program (called 'prog.pl') will run it but the window won't stay open long enough for you to see what the output is. Whilst this is fine when you want to run a program that processes some data and then exits, if you need to see the output at the command line you're a bit stuck. The solution is to open a DOS Box (Programs | Accessories | Command Prompt in Windows XP), open up the program directory in Windows Explorer, drag the file across and drop it in the box. The path and program file name will appear. Press 'Enter', and it will run.

Passing lists to subroutines

```

1 #!/usr/bin/perl
2
3 $a = 21; @b = reverse (1..7);
4 &workitout ($a, @b, 12);
5 exit;
6
7 sub workitout {
8     @iarray = @_;
9     foreach $x (@iarray) {
10         print "$x ";
11     };
12     print "\n";
13 }
  
```

1 When more than one variable is passed to a subroutine, it is passed as a flattened list. All that this means is that it is passed to the subroutine as one value after another, with no distinction between the origin of any value. This list is placed in '@_.' and running the above example produces: '21 7 6 5 4 3 2 1 12' as the output.

```

1 #!/usr/bin/perl
2
3 $a = 21; @b = reverse (1..7);
4 &workitout ($a, @b, 12);
5 exit;
6
7 sub workitout {
8     while ($x = (shift)) {
9         print "$x ";
10     };
11     print "\n";
12 }
13
  
```

2 Instead of using '@_', we can use shift to dismantle the list, one by one, from the first to the last value in that order. This can come in quite useful if you just want to use a value once. Another use for it is, as you can see, that it makes for a shorter subroutine. However, problems arise if you want to use the value again.

```

1 #!/usr/bin/perl
2
3 $a = 21; @b = reverse (1..7);
4 &workitout ($a, @b, 12);
5 exit;
6
7 sub workitout {
8     foreach $x (0..$#_) {
9         print "$_[x] ";
10     };
11     print "\n";
12 }
13
  
```

3 Of course, '@_' is effectively an array (albeit specific to this subroutine) and therefore you can access its properties in the normal way. In the example above, the maximum index is '\$#_' and we have used a foreach loop to go through it one at a time. Within this, we accessed each element using its scalar name with the index in square brackets.

My variables

Localising variables within subroutines

Having eliminated the need to remember variable names when interacting with subroutines, we still have the problem of avoiding the use of variable names inside the subroutine. Many subroutines are more than just a line or two long, so while it's possible to do a great deal

just using the default variables, such as '@_', there are limits.

Instead of devising variable names that you probably won't use elsewhere, or trying not to use those that are in your subroutines in the main body of your program, you can make a variable name special for that

subroutine. In the subroutine definition, after you have written 'sub routine_name', use curly braces to define the subroutine code. Within them you can declare variables using 'my' to make them local to that code block. You can now use that name elsewhere without interference. ■

```
1 #!/usr/bin/perl
2
3 $x = 3;
4 print "x = $x\n";
5 $x++;
6 print "x = $x again\n";
7
8 sub r1 {
9     my $x = 9;
10    print "now, $x = $x\n";
11 }
12
```

Use 'my' in a subroutine and don't worry about using that name anywhere else in your program.

GOING FURTHER

Perl is good for just getting on with writing your program. The language has a great deal of latitude and tolerance, and there are usually a number of different ways of doing something. This month you've seen how to make your programs shorter, simpler and more versatile. In addition to this, you can also reuse your subroutines in other Perl programs that you write. And, as you know how to stop your variables from interfering with those in your other programs, they are truly portable.

3 Passing values

One of the problems we have with our 'addxy' subroutine is that we need to remember that it uses two input variables, one called '\$x' and one called '\$y'. If we already have two such variables in use, we will need to save them temporarily, substitute our values for the addxy routine, call the routine and then copy '\$x' and '\$y' back to what they were beforehand. If that is inconvenient, consider that when you come back to your program in the future, you might have forgotten about '\$x' and '\$y', set them a few dozen lines before 'addxy' is called and then wonder why the program isn't working the way you would expect it to.

You can eradicate this problem by passing the values to your subroutine when you call it, instead of setting global variables a few lines before. However, if you start passing values, you'll probably need to declare the subroutine if it's used in the program before it's defined – unless it is obvious to Perl that it is a subroutine. In the example below, we pass one value to a routine called `add3`:

instead of a single variable, using '\$addy (2, 3);' or even '\$addy (@two_numbers);'. In the subroutine we could shift several times so that we might end up with '\$z = (shift) + (shift);'. However, the problem with using shift directly like this is that we can only use each value once. Have a look at the boxout '*Passing lists*' for more on different ways of accessing lists that have been passed to a subroutine.

4 Returning variables

So far, we haven't managed to get rid of the problem of the returned value being stored in '\$z'. But you'll be happy to hear that this is actually quite an easy thing to do. You just have to use 'return' as follows:

```
$z = &addxy(2, 3);
print "$z\n";
sub addxy {
    return (shift) + (shift);
}
```

This function returns the value as the result of 'addxy', thus relieving us of the requirement to use a global variable.

However, a subroutine will return the last expression that has been evaluated. So, instead of `'return (shift) + (shift);'`, we could just use `'(shift) + (shift);'`. If you did this in a non-subroutine context with warnings switched on, Perl would tell you about a pointless use of addition in a void context but here, it is the returned value.

Perl's philosophy is that you should not be limited and, of course, you aren't limited to returning just the one value. You can see how to do this in the boxout *'Return of the lists'* at the bottom of the page. In addition to this, I've explained how to use variables within a subroutine without affecting those in the rest of your program, even if they have got the same name. In order to see how you can do this, have a look at *'My variables'* at the top of the page. **PCP**

```
$x = 6;
&add3 ($x);
print "$z\n";
sub add3 {
    $z = (shift) + 3;
}
```

We could have condensed the first two lines into one that said `'&add3 (6);'` but here you can see that we can pass variables, as well as literals, to subroutines. One thing to note is that we have passed just one variable, and we access that directly using `'shift'`. Using `shift` like this takes the first value passed to the subroutine and uses it however we have chosen. Here that is by adding `'3'` to it and storing it in `$.z'`.

If we wanted to pass more than one variable, such as in our 'addxy' routine, in the main program we would pass a list

NEXT MONTH

We'll look at program input and output and then bring together all we've covered.

```

1 #!/usr/bin/perl
2
3 use strict;
4 print "On its own... \n\n";
5 use Getopt::Std;
6 my $opt = GetOptions();
7 foreach my $opt ($opt) {
8     print "opt: $opt\n";
9 }
10
11 sub test_getopt {
12     my $val = 0;
13     foreach my $opt ($opt) {
14         $val += $opt;
15     }
16     return wantarray ? $val : $val[0];
17 }

```

Pay attention to this and your Mars probe might not smash into the planet next time.

Return of the lists

Return lists or scalars, depending upon which has been requested

We know that you can return a single variable either by using an explicit 'return \$x;' which exits the subroutine immediately, or, the subroutine returns the result of the last expression that was evaluated. However, it is also possible to return a list. Call the subroutine like this:

```
@a = thisfunction ($x);
```

A list of values is expected to be placed in the array '@a'. In the subroutine, this is done either by using an explicit return with the list following it, or, as the last expression evaluated. Note that you don't have to have your return list all in one array as Perl will flatten out the list

that you provide it with, as it does when you send a list to an array or a subroutine. If you needed to have your list output formatted in a particular way, your last line to be evaluated could be:

```
('Hello', 5..$x, @op1);
```

Do check '\$x', as the range operator will only work if the last number is greater than, or equal to, the first.

This is fine if we know that we need to return a list. But, if you look at the screenshot, you will see that we have a function that returns a single, scalar value when it is asked for one and, when asked for a list, it knows to return a list. This could then be done by

looking at the number of values that are passed to the subroutine, thereby guessing what type of return is needed. However, this is not always useful and, no surprises here, there is a better way.

If you look at the subroutine 'feet_to_metres', the last line of code (16) has our favourite ternary operator in it, which is the single-line equivalent of an if-then-else block. In it we use a special function called 'wantarray'. This detects whether the subroutine is being used in a scalar or list context. Around this result we have built our return. It returns an array if one is asked for, otherwise it returns a scalar, which is the first element of the array and the only one processed by the foreach loop. ■

Structuring a book

PROJECT TIME



2 HR 00 MINS

SKILL LEVEL



8 INTERMEDIATE
Good knowledge of Word and experience of authoring useful

YOU'LL NEED THIS



Microsoft Word

Rob Lawton reveals how useful Word's document management tools are. You'll be writing a bestseller before you know it...

Word is more than just a text editor, it's also adept at long document management, thanks to its built-in indexing and table of contents tools. It can also be used for page layout, though its graphics-handling and text flow can prove complex and unpredictable compared to DTP programs. However, it is undeniably more effective at the opposite end of the process, when the ideas themselves are being formed. This project demonstrates that these tools can be used effectively throughout the whole process of planning, writing and printing a novel.

1 Why use outlining? Writing isn't simply about getting words on paper, it's also about ideas, and the words are simply the final expression of those ideas. And yet, the process of developing, organising and structuring ideas is often overlooked. But unless you get the ideas right at the very start, putting them into words is going to be a slow, laborious and tortuous process.

This is where Word's outlining tools are so valuable. They enable you to get your ideas down first, then structure them, and then 'fill in the gaps' with the text.

Outlining has some very important advantages. First is the fact that it enables you to dash down all those ideas in any order, in a kind of free association exercise. As a result, working out what they mean, how they're relevant and what order to put them in comes much later.

Secondly, it enables you to work out the scope and direction of the whole project. This might include what you're trying to say, how you're trying to say it, and where you're trying to get to. It's easy to lose sight of all these different strands if you attempt to write in a linear fashion, trying to hold all this information in your head.

Thirdly, it enables you to compare the size of the project with what you've got to get across. This means that you can allocate numbers of words or pages to each section, depending on their importance relative to the whole. And you'll know how much you've got to write for each section.

Finally, you can split your project up into bite-sized chunks. Most people would agree that it's very difficult indeed to sit down and write 10,000 words. The sheer size of the job is daunting. It's much easier to sit down and write 200 words of text about a very specific subtopic.

2 Get your ideas down You can switch to 'Outline' view in Word either by using the button in the bottom left of the document window, or by using the View menu. The display changes to reflect the structuring tools now available.

The principle is quite simple. Information is now organised hierarchically (much like directories-within-directories in Windows) using a system of 'Heading' numbers. 'Heading 1' corresponds to the highest level, 'Heading 2' to the next highest level and so on, all the way down to the lowest heading level, 'Heading 9'.

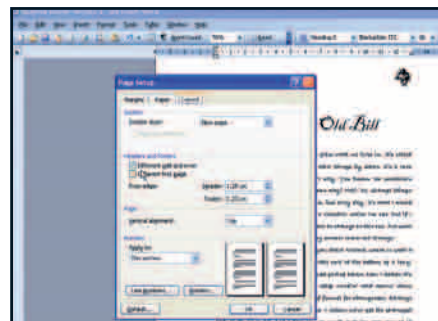
The pop-up menu on the Outlining toolbar lists these as 'Levels' 1-9, but they also correspond to the 'Heading' 1-9 styles in the Styles and Formatting pane.

Once they've been created, headings can be promoted or demoted, and they can be moved up and down the list. When you're in the early ideas-generating stage you can simply write down all your ideas as they occur to you, then organise them into a hierarchical structure reflecting their importance, how they relate to the other ideas and the order in which you should explore them.

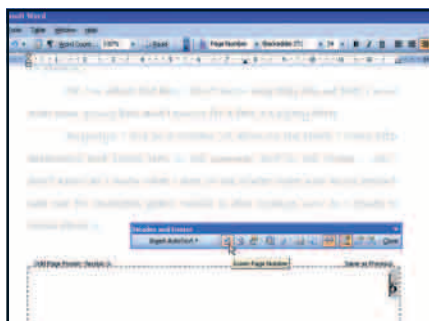
By doing this you make sure you get all your ideas down before they evaporate or get forgotten, and you then

<http://forum.pcplus.co.uk>

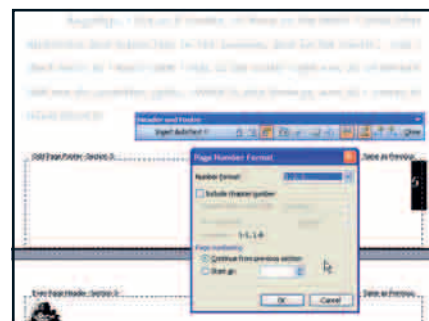
Inserting page numbers with odd and even footers



1 If you want symmetrical odd and even (left and right) pages, set this up in the 'Page Setup' dialog where you'll find a 'Different Odd and Even' checkbox. Then set up headers and footers, for odd and even pages, by moving to an example of each in turn with View | Header and Footer enabled.



2 With the insertion point in the footer area, click on the 'Insert Page Number' button. We've already done this, and it's highlighted to the right of the footer area. You can apply text formatting and alignment options to this footer text, just as you can to any other text in the document.



3 You can also change the numbering format. Select the page number (the grey highlighting indicates it's an active text field, rather than fixed text) and click 'Format Page Number' button. Leave the default 'Continue From Previous Section' option selected if you want continuous page numbering.

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translate them into the linear form required for publication, and all without writing a single word of 'real' text.

3 Begin the writing process Once the outline structure is complete you can get writing. For this you can use Word's body text style. This is completely neutral as far as the information hierarchy is concerned. It can be written underneath a 'Level 1 heading' or a 'Level 9 heading', and moved freely around the information hierarchy as required.

In Outline view, each paragraph (Headings and Body text) has a handle immediately to its left. You just have to click on this to select the whole paragraph in order to be able to move it, or cut and paste it to a new location.

Headings display either a '-' symbol to indicate they have no subheadings or body text, or a '+' symbol to indicate that they do. Subheadings and body text can be expanded or collapsed to help you focus on specific areas of your outline.

You can also use the Navigation pane. This displays your headings and subheadings in a hierarchical structure, which can also be expanded and collapsed. These changes are reflected in the document itself. The Navigation pane can be used to move around the document too. You simply click on the heading in the pane to go straight to that heading in the main document window.

4 Make global modifications to text styles This is one of the wonders of Word's outlining system, and its document structuring tools as a whole. The structure you put into place right at the very beginning achieves much more than simply helping you organising your ideas does; it remains the 'skeleton' that holds the document together.

Specifically, in this instance, you can modify any of the heading styles to suit the demands of the published document, or your own typographic preferences. Just select some existing heading text, alter the text properties to whatever you choose, then update the existing style via the heading's entry in the Styles and Formatting pane.



Subdocuments are a way of breaking up whole publications into more manageable parts. The master document simply contains hyperlinks to the separate subdocuments.

Alternatively, select an existing style from the pane, and use the 'Modify' option to make the changes. You only have to do this once. All the instances of that style in the document will then be updated automatically.

5 Handling large documents Documents can eventually become too large to handle. This may be because their sheer length is becoming a problem, or because they're structurally complex, like a textbook.

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How Word handles imported graphics

Word's handling of graphics isn't quite as straightforward as it might seem

Page layout programs are designed for layout first and content second, whereas Word works the other way around. So, in a page layout program you'd make sure the content fits the layout, but in Word you often have to check the layout still works after the content has been altered.

When you insert graphics in Word, they're embedded in the text at the insertion point. As a result, they flow with the text as you make alterations, and this reflowing can make page layout a bit hit-and-miss.

Clearly when you're designing for publication you'll want more control

over the graphics placement than this. The solution in Word is to change the 'Text Wrapping' via the Picture toolbar. If you choose the 'Square', 'Tight', 'Behind' or 'In Front' options, the image is no longer embedded in the text.

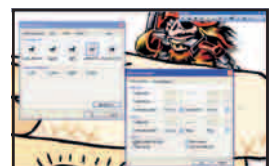
However, Word will still attempt to maintain its position relative to the text, moving images unexpectedly when the text reflows. To prevent it from doing this, you need the 'Format Picture' dialog and the Layout tab.

Clicking the 'Advanced' button will reveal further options. Among these is a 'Move Object With Text' box which is checked by default. This is the villain.

You'll need to deselect this for each graphic you import, in order to prevent Word from moving it.

This is an example of Word trying to be helpful by second-guessing your intentions in order to make your life easier. Unfortunately, if precise and reliable graphics positioning is what you need, it has the opposite effect.

In any event, you should really avoid using Word to lay out pages ready for commercial printing, as bureaus are not fond of it. If you are planning on laying out the pages yourself, rather than handing it over to a designer, Publisher is a better bet. ■



If you want graphics in Word to have a fixed, absolute position, you need to disable the 'Move Object With Text' option in the 'Advanced Layout' dialog.

"Things have changed since the horrendous vector art collections of the 80s. Word's Clip Art collection now resides on the web, and contains many good illustrations."

PASSING SHOT

Clip Art illustrations

If your book is for a younger audience, pictures are vital, which is why Word's Clip Art pane is so useful. And, thankfully, things have changed since the horrendous vector art collections of the 80s. Word's Clip Art collection now resides on the web, is updated constantly, and contains many rather good illustrations. What's more, the Clip Art pane has a search facility. For our novel, all we needed to do was type in 'pirate' and then browse the dozens of matching images that came up. Clip Art comes in four main formats: vector artwork, bitmap images (photographs), movies and sounds. And all four can be selected via the Clip Art pane.

What you can do, though, is split your document into a 'master' and a series of 'subdocuments'. What you're doing here is separating out the selected text to save it as a new, and separate, document. The master document, which is the one you're working on, can continue to display the text but as a linked file. This will be indicated by a border, and a subdocument symbol to the top left.

If you're working on a publication with a number of others, creating subdocuments enables them to work on individual chapters or sections without needing the whole document. It also lets you control how much access individual team members have.

The Outlining toolbar has icons representing these master and subdocument options. Click the 'Master Document View' button to enable the others. You can also expand subdocuments to display their contents in the master document, or you can contract subdocuments to simply display their pathname as linked files.

So should you edit subdocuments within the master document or as separate files? The good news is that it doesn't matter, because it amounts to the same thing. The two options are simply different windows on the same document. The only restriction being that you can't do both at once. If someone else is working on a subdocument, it'll be locked in the master document until they've finished.

When you split a document into subdocuments, the subdocuments are named automatically as saved in the same directory as the master. You can move the master to another location later, but the subdocuments stay where they are. The master retains their full pathnames, however, so it will still reference them as if nothing had changed.

subdocument' button. You'll then be prompted to locate the file you want to insert.

Note that text styles can still be modified and applied globally even when you're using subdocuments. This is one of the great things about Word's document management tools, they're scalable. As your document grows in size and complexity, it retains its structural backbone.

7 Dealing with section breaks Word automatically inserts section breaks with subdocuments, and this is where things can start to become a little trickier. This isn't because Word can't paginate long documents, but because you'll need to know exactly how it goes about doing it. In particular, you do need to understand how the program handles section breaks.

When you split a document into subdocuments, or when you merge an existing document as a subdocument, Word automatically inserts a section break, which starts the subdocument on a new page. You can then switch from 'Outline' to 'Print Layout' view to check this.

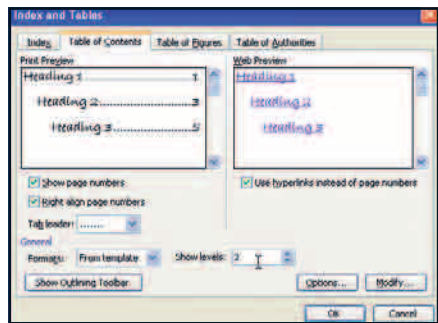
This may well be all you need. If each subdocument corresponds to a new chapter in the book, and each chapter starts on a new page, what more is there to do?

There is a convention though, as daft as it might sound, that chapters should always start on a right-hand page. Whereas Word will simply start them on the next available page, which could be a right or a left.

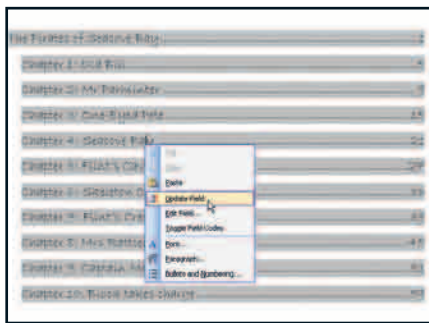
Now you can modify the section break. If you click in the relevant subdocument, go to ‘Page Setup’ on the File menu and choose the ‘Layout’ tab. You’ll then see a Section Start menu, and you’d be forgiven for thinking that all that was left for you to do was to choose the ‘Odd Page’ entry. But this isn’t the case. Word will create blank pages as necessary in order to start new sections on an odd page, but it won’t print or display them. So, unfortunately, you have to resort to inserting standard page breaks manually if you want these blank even pages to display or print.

6 Merge in new subdocuments We've been assuming so far that you've created subdocuments from your original, but you may also want to assemble a document from a series of existing files. To do this, place the insertion point where you want to insert the new file and click the 'Insert

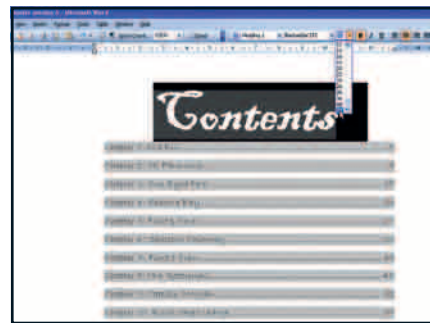
Creating tables of contents automatically



1 How detailed do you want your table of contents to be? The ‘Show Levels’ setting you choose in the ‘Index and Tables’ dialog corresponds to the outline heading levels you used when building your document’s structure. In this case, we only want ‘Level 1 headings’, corresponding to our chapter headings.



2 Word lists all occurrences of the heading levels you've chosen, and displays them in the order in which they appear in the document. It's important to remember that if you subsequently make any changes, you'll have to regenerate this Table of Contents (TOC). Right-click within the TOC and choose 'Update Field'.



3 You might find that your TOC contains items other than the chapter headings. Here, you can see we have an entry at the top corresponding to our document's title, but this can be changed manually. Select the entry, type in the replacement text and choose whatever formatting you want to apply.

"Inserting a table of contents is one of those bits of Word magic that make you extremely glad that you stuck to a structured approach throughout."

8 Set up facing, or 'mirrored' pages To do this you need the 'Page Setup' dialog and the 'Margins' tab. Find the 'Mirror Margins' option in the Multiple Pages menu. However, you will only need this if you want to use different margins on the inside and outside of the pages. This might be the case if you were designing a book for binding, for example.

If you simply want headers and footers mirrored, so that page numbers and titles are always on the outside of bound pages, you need the 'Layout' tab, where you check the 'Different Odd and Even' box.

This alters the way in which you add or edit headers and footers. If this box is unchecked, the same header and footer is used throughout. If it's checked, you need to enter headers and footers for both odd and even pages.

9 Adding page numbers Long documents need page numbers. These aren't just to aid navigation for those reading them, but so that you can add indices or tables of contents. Index generation is a specialised topic we don't have the space to cover here, but we will explain how to generate a table of contents automatically from chapter headings and page numbers.

Inserting page numbers is straightforward. Use View | Header and Footer to display the header and footer areas on the page, and also the 'Header and Footer' toolbar. Click in the footer area and click the 'Insert Page Number' button to add the current page number. To change the number displayed, use the 'Format Page Number' button. You can choose the number format and whether the numbering starts from a specific value or is continued from the previous section, the latter being the default.

Incidentally, page numbering is specific to each section. It can be useful to number them individually and manually, but only where there's a specific requirement for this. For example, preliminary pages in books are often given roman numerals, and arabic numbering doesn't begin until the first page of the first chapter, or the start of the 'real' content.

Remember that if you've set up odd and even headers and footers, you'll need to insert page numbers for both odd and even pages.

10 Inserting a table of contents This is one of those bits of Word magic that make you extremely glad that you stuck to a structured approach throughout. Word generates the table of contents (TOC) by looking for each instance of a specific heading style (corresponding to chapter headings and subheadings as required), placing it in a TOC field and adding the page number on which it occurs.

However technical the process may sound, Word handles it in a very easy way. First, place the insertion point where you want to insert the TOC. You may need to insert a page break or two in order to make space for it, and retain the existing odd/even section breaks in the document.

Then use Insert | Reference | Index and Tables, and choose the 'Table of Contents' tab. What you need to look for here is the 'Show Levels' pop-up. This will enable you to choose how many levels of headings are included in the table of contents.



Although the TOC is generated as a self-contained field in Word, you can modify individual text within it. For example, your TOC might include the title of the whole document and not just the individual chapter headings. To modify the text in this case, you would select it, change the text to 'Contents', for example, and change the font and size.

If you modify the content or the pagination of your publication later, you'll have to regenerate the TOC as it doesn't automatically update itself. It's easy enough, though. All you have to do is right-click anywhere within the TOC field, which highlights in grey to show it's selected, and choose 'Update Field' from the shortcut menu.

11 Printing your large document You can do this in a variety of different ways. These will largely depend on your printer model, and how you propose displaying or binding the printed pages. The simplest approach is to print each page on a single sheet, but if your printer supports duplex printing, you could print on both sides.

There is another printing option that you might like to explore at some point. The Multiple pages menu has a 'Book fold' option. This switches the paper to landscape format and prints two pages per sheet. So you could use this to print sheets that are designed for being folded and saddle-stitched into an A5 booklet, for example.

It doesn't matter if your printer doesn't support duplex printing, because the Print dialog has a 'Manual Duplex' checkbox. With manual duplex printing enabled, Word will print out the first lot of sides, then instruct you to turn the stack of sheets over and feed them back into the printer so that you can print the other sides.

A word of warning here: a dry run is a good idea so as to ensure that you don't waste a whole stack of paper by feeding the sheets in the wrong way. And, this will only work with a comparatively small number of sheets, or the stack will become too thick to staple and fold. **PCP**

When you use outlining to construct and organise large documents, you will have to modify text styles globally, even where you've split your work into subdocuments.

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AMD's answer to Vanderpool **p13**

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Richard fears data vampires **p17**

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A new dawn

**DUAL
CORE
ON TEST**

Coming to a PC near you: the dual-core invasion begins

A new age of multi-core computing has dawned. But the first dual-core processors from AMD and Intel (see page 34 for our in-depth coverage) are just the beginning. The next 18 months will be peppered with new processor launches in all parts of the market. By late 2006, everything from desktop PCs, to servers and laptop computers will be humming to the tune of dual-core CPUs.

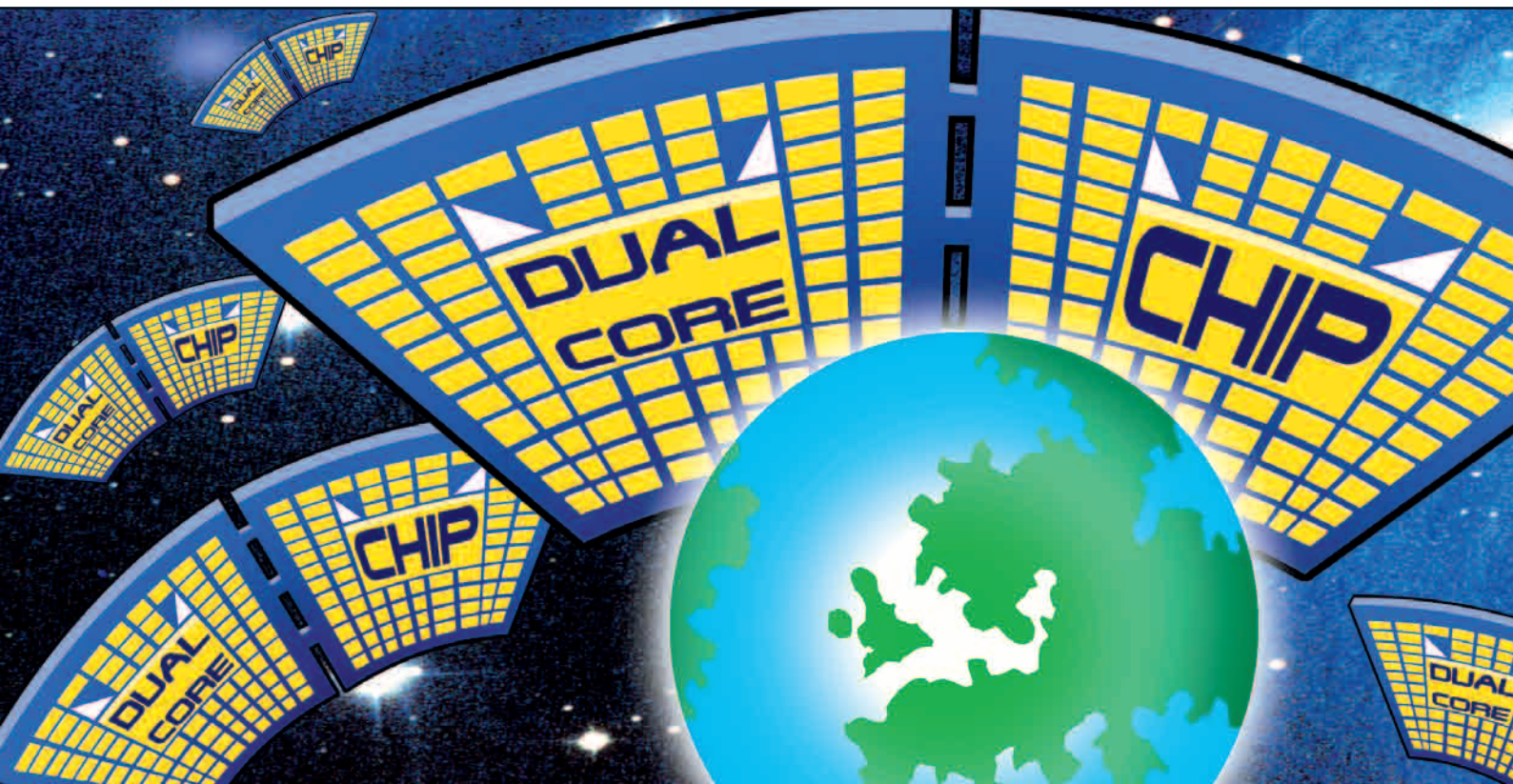
First up for Intel, following the launch this month of the Pentium D and Pentium Extreme Edition processors, is a dual-core revision of the massively successful Pentium M mobile CPU. Codenamed Yonah, full details of this exciting new chip – due out late 2005 or early 2006 – haven't been released, but it's clearly shaping up to be a much more

advanced dual-core architecture than the Santa Clara outfit's initial desktop effort. Manufactured on Intel's upcoming 65nm process technology, Yonah will build on the existing strengths of the Pentium M, but also address a number of key weaknesses. The most obvious indication that the chip is more than a pair of unmolested single core CPUs thrown together on a single die is the cache memory arrangement. Unlike the debut dual-core chips from Intel and AMD, Yonah's 2MB of L2 cache is shared between both execution cores. It's a more complex set-up to implement, but theoretically also more efficient. Performance-wise, Intel has beefed up both SSE and floating point performance, two areas where the Pentium M struggles in comparison with the firm's Netburst-based desktop

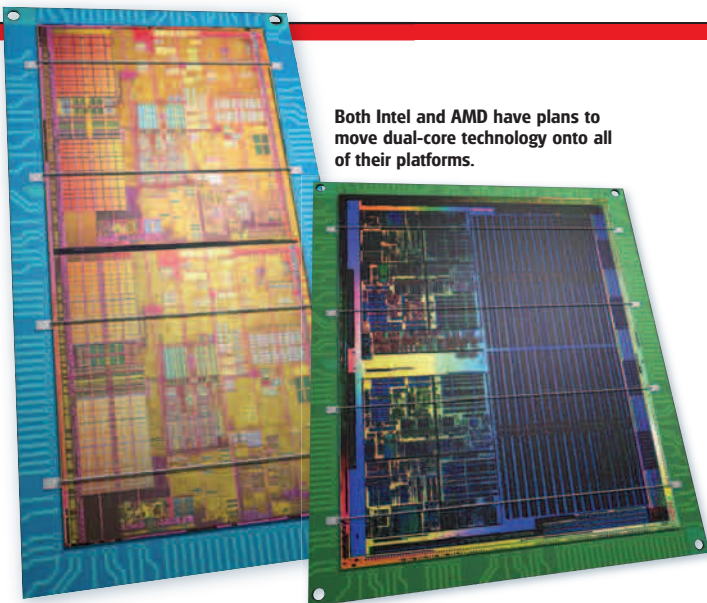
and server chips. Not only has SSE decoder throughput been improved, but support for SSE operations has been added to the chip's Micro Ops Fusion engine. Add in the enhanced floating point performance, support for Intel's OS virtualisation technology and a faster 667MHz bus and it doesn't take a leap of faith to imagine Yonah as an extremely effective desktop processor. It might just make AMD's dual-core architecture look less glamorous, too. The only ingredient apparently missing is 64-bit memory addressing. Nevertheless, Intel claims that the chip will be, at least, as sparing in terms of power consumption as current Pentium Ms.

The Israeli design team behind Yonah may have produced another winner, but back in the US, the

by **Jeremy Laird**



Both Intel and AMD have plans to move dual-core technology onto all of their platforms.



Chipzilla's server and desktop processor engineers have been just as busy. The first quarter of 2006 will see the unveiling of two new dual-core Xeon CPUs. Intriguingly, Dempsey, designed for dual socket platforms and built on the new 65nm manufacturing process, will actually be two separate slices of silicon, or dies, on a single 'multi-chip' package. Intel won't go into specifics regarding the reasoning behind this, but indicated that manufacturing flexibility and yields are significant factors.

Then there's Paxville, the dual-core Xeon for the multi-processor space. It shares the 90nm process technology and single-die approach of the Smithfield, the chip behind the dual-

"BY LATE 2006, EVERYTHING WILL BE HUMMING TO THE TUNE OF DUAL-CORE CPUS"

core Pentium D processors. But unlike that CPU with its discreet bus interface for each core, Paxville has a single interface, which incorporates a set of buffers designed for electrical loading on the system bus. As for supporting platforms, the Dempsey DP processor will benefit from the dual bus arrangement of the new Blackford chipset. The E8500 chipset that will underpin the Paxville MP CPU, however, implements a shared bus for each pair of installed processors.

But what of AMD? It may have a market capitalisation of over £31 billion, but it's still on a shoestring operation compared with Intel (£74.2 billion at last count). Much like its existing single product line up, then, AMD's economical, but effective dual-core family is derived from a single architecture. After the dual-core Opterons, as launched this month, the next processor due for the dual-core treatment is the Athlon 64. To be called the Athlon 64 X2, the new chip will clock between 2.2GHz and 2.4GHz and come configured with either 512K or 1MB of L2 cache memory per core. PR ratings will range between 4200+ for the entry level 2.2GHz 2x 512K cache chip to a dizzying 4800+ for the top-end 2.4GHz 2x 1MB monster. Pricing hasn't been announced yet, but it's worth noting that these will be pitched as mainstream performance chips, so expect them to come in well under the enthusiast Athlon 64 FX processors. Plans for AMD's Turion mobile CPU, meanwhile, are not as clear. The company has confirmed that a dual-core revision will appear, but hasn't said what or when. Given AMD's relatively limited resources, it might choose to hold back until the move to 65nm, probably in the latter half of 2006.

CHIP TECHNOLOGY

A fading singularity

The arrival of dual-core processors will naturally accelerate the demise of the humble single core chip

The demands we place on the core logic of our systems will continue to evolve, which in turn will force a migration away from single core processors over to dual-core alternatives. This was one of the reasons that led to Intel's decision to cancel development of its 4GHz Pentium 4 processor, and instead, "... deliver more benefit to our customers by accelerating dual-core processors to market". It's not so much that single core processors are dead; rather that simply increasing the frequency of such chips isn't enough to accommodate our needs. But what plans do both Intel and AMD have for the future of single core processors?

Presler is the codename for Intel's next major desktop dual-core processor, which will approach the dual-core idea in a different way – using two separate cores in one package. Cedar Mill is the single core alternative to Presler, and will use just one of these cores. This chip is expected to be released in the first quarter of next year, and is designed to keep the NetBurst flame burning for a little longer. Processors based on this 65nm core are expected to be compatible with LGA 775 packaging, have support for HyperThreading, and consume considerably less power than current Prescott cores.

AMD's short term plans for its single core chips are similarly focused on the performance enhancements, derived from moving to a smaller manufacturing process. Its Athlon FX range is set to get a new 90nm core, codenamed San Diego, which should keep the chip competitive until the first quarter of 2006. Details aren't available yet, but this core is expected to hit 3.2GHz by the turn of the year. This new core also ushers in support for Intel's SSE3 instructions, which will also migrate to the more mainstream Athlon 64 chip with the upgrade to the Venice core – again using a 90nm process.

Such single core plans do seem to fall off the roadmaps by the second half of next year, though. While we don't expect to see single core chips disappear completely, as applications move over to a more multi-threading aware design, this is only going to accelerate the demise of the single core chip.

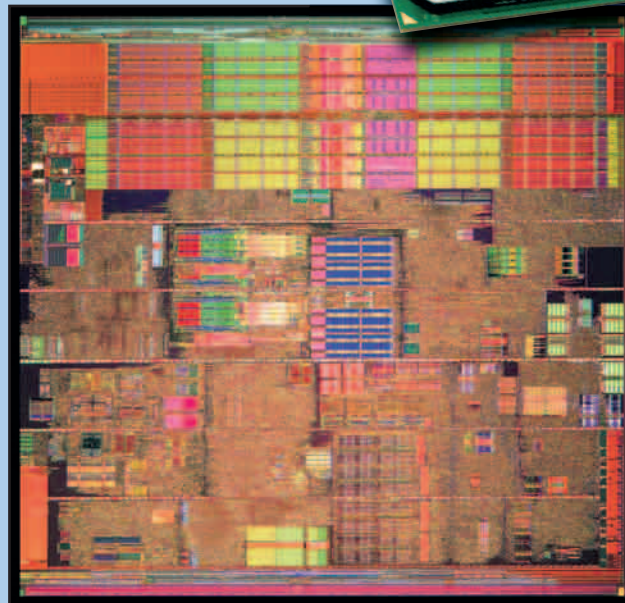


Illustration: Stuart Harrison

GRAPHICS HARDWARE

Dual-video duel

Just when you thought two cores was enough, the graphics chips firm are doubling up again

There are several schools of thought when it comes to Nvidia's twin graphics card SLI (Scalable Link Interface) technology. One school says it's over-rated nonsense, which doesn't give value for money, as two mid-range cards are only as good as one high-end card.

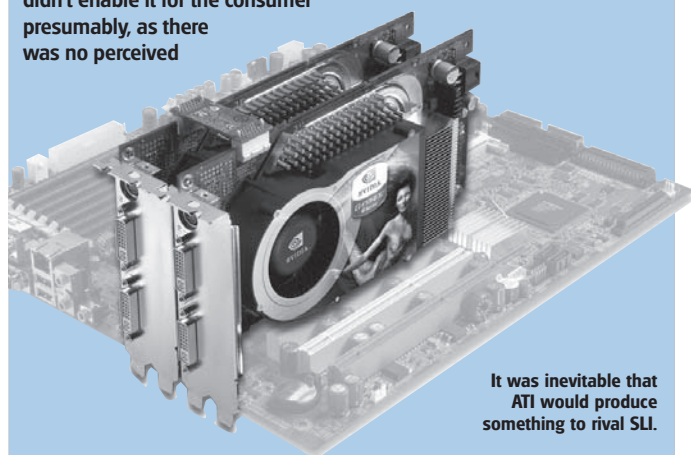
However, school number two points out that you can buy a cheap card now and upgrade later at a lower cost. School three turns round and points out certain compatibility issues, while school four – which is a school subscribed to by people very close to Nvidia – says "wow, we really didn't expect quite so many SLI systems to be sold quite so quickly. Didn't Nvidia just manage to get double hits for its market share from that?"

It was almost certainly school four that really ground ATI's teeth. In response, the company pointed journalists at a website showing a very realistic military flight simulator, which has been up and running for several years, the graphics for which are provided by several 9700 chips linked together. Apparently, it's had an SLI-type technology called ATI Multiple Rendering (AMR) built into its chips for years, but didn't enable it for the consumer presumably, as there was no perceived

demand. Now, however, ATI has confirmed that AMR will not only be a feature not just of its forthcoming R520 chip, but will also be enabled in its existing line-up via a driver release. It also claims that it will be able to make AMR work across any two ATI boards (Nvidia's SLI processors have to be matching types – a 6600 won't work with a 6600 GT, for example) and that its graphics cards won't need a bridge PCB to work together, as they'll simply use the PCI Express bus instead.

All this is very well, of course, but samples of AMR working on consumer boards have yet to be seen. One industry rumour – denied by ATI – is that it's this very issue of the separate PCB that Nvidia uses for SLI, which is holding up the launch of R520, and that the Canadian company is struggling to make AMR work without implementing something similar to it.

Indeed, some insiders go so far as to suggest that a whole new respin of R520 has been necessary as recently as March. With SLI proving unnervingly popular with system builders you can be sure it won't be long before AMR sees the light of day.



It was inevitable that ATI would produce something to rival SLI.

SCREEN TECHNOLOGY

LCD gets a rapid response unit

No longer do LCD monitors have to eat the dust of CRT rivals

Right, that's your last excuse gone. Pick up that hefty beast of a CRT monitor (if you can), hurl it out of the window, and get yourself off to PC World to buy an LCD display. Finally, we have some LCD screens with response times that match the best CRT refresh rates.

This month's trailblazer is Viewsonic. The American company has announced a new range of monitors with 4ms response times which, in layman's terms, means that it takes the screen 4ms to change a pixel from one state to another. Although this figure isn't directly transferable to CRT, as that technology doesn't change pixels in the same way, it's safe to say that it puts LCD panels on a par with the very best that CRT has to offer. As Viewsonic's European Product Marketing Manager, Russell Cole, says, "All aspects of motion images are improved. Faster response times allow pixel transitions to speed-up to the point where most of the previous disadvantages are in many cases totally eliminated."

This advance marks a real turning point in the monitor market. Up until now, response times have been used by many as the benchmark by which panels are judged, so all manufacturers have strived to push their figures lower and lower. Now that the 4ms mark has been reached, it's unlikely that we'll see much further improvement. Russell Cole explains: "There is very little room for further improvement from the panel technology side. There's



Viewsonic has been fast out of the traps with the first 4ms display.

still potential for further development with the electronics and software whereby 'predictive' functions and algorithms could improve, but this is probably going to generate little impact on real-world performance."

Nonetheless, you shouldn't take this as a sign that the development of LCD will cease. Cole sees huge potential for further improving the technology: "In a CRT, the activated phosphor will decrease in brightness until it's scanned again. The human eye detects the decrease in brightness and when the frame changes, an improved perception of movement results. So perceived response time gains will come from simulating the positive elements of CRT flicker by such techniques as blinking-backlights, backlight-shuttering and black-frame-insertion."

IN BRIEF

→ The open-source encyclopaedia project **Wikipedia is launching a CD/DVD version** to compete with programs like Encarta and Britannica. Entries will be given a quick once-over to make sure that they don't contain stolen or otherwise inappropriate material. A German version is already available, with the English version soaking up over two DVDs.

→ The Linux distribution **Ubuntu is making waves in the Debian community**, with more and more realising just how out of date Debian is now. Please send complaints about stability to the usual address. Ian Murdock, Debian's project leader goes so far as to call Ubuntu's success 'A net negative for Debian'. No sour grapes there at all, oh no.

→ Researchers have conclusively announced that **you're unlikely to fry your brain with a mobile phone**, probably. Working in the UK and Denmark, the test compared the health and phone habits of over 400 people with tumours with 800 without, finding no correlation. As for the 'probably' part? Everyone still recommends using hands free kits.

DOWNLOADING

©Sony Pictures



iTunes for movies

Are we willing to pay to download from Sony's burgeoning online film service?

ITunes is now an established part of our culture, yet movie downloads are still illegal. Sony plans to change this with Connect, a download service that will offer legal downloadable films at reasonable prices. "We want to set business models, pricing models, distribution models like Jobs did for music, but for the film industry," said Michael Arrieta, the senior vice-president of Sony Pictures.

Intriguingly, Connect will be available on mobile phones and on Sony's PSP portable gaming platform: www.psp.connect.com offers free downloads of movie trailers and shorts. (Apple, of course, already offers movie trailer downloads.) Moreover, Sony are selling their own (unsurprisingly proprietary) converter software, to turn movies on your PC into PSP movies. There

doesn't appear to be any copy-protection system built into this. Of course, our compatriots across the pond already have access to movie downloads, in the shape of Movielink (www.movielink.com) and CinemaNow (<http://cinemanow.com>). These movies are about \$5 (£2.60) and expire after 24 hours.

Yet, this doesn't cover the largest UK downloads market: television. The obsession of the British public with the low-res box means that this is the focus of our illegal downloads on sites such as www.uknova.com or www.couchtracker.com. Channel Five are selling TV shows for download at £1.50 each, but only a very limited selection, and the BBC is promising to enable consumers to download all shows for free for up to eight days after they've been on TV. Ben Drury of 7 Digital, the download company behind Five's technology, explained that "Broadcasters have seen the revenues attainable from music downloads and are eager to do the same with their own content."

A cheap, quick movie-download service will garner many customers. But while Britain lags behind in terms of broadband speeds, reliability and take-up, and free downloading is as easy as ever, the British public will turn to their TVs, their Blockbusters and their increasingly disparate illegal downloads.



TECHNOLOGY

Doctor inkjet

How inkjet technology could soon fix fractured limbs

Inkjet printers could soon be used to fix fractured limbs and heal injuries. Scientists at the University of Manchester are working with industrial inkjet manufacturer Xaar to develop medical inkjets that can 'print' human cells onto a patient.

Of course, it's a bit more complicated than filling a Deskjet with genetic glop. As Brian Derby, professor of material science at the University, explains, the inkjet reservoirs are filled with different biochemical inks: "One is a polymer that gels after printing to provide structural support," he says. "This is a material that will degrade over time and be absorbed and disposed of." Other reservoirs contain cells of the required type, which may be harvested from the patient, such as bone marrow stem cells, to reduce the risk of rejection. Others contain a mix of nutrients and biochemicals.

"To build an object, we break it down into layers as a design file," Derby says. "The printer builds one



layer of the object. The platform is lowered and the second layer is overprinted; the process repeats until the thickness is built. Because we have several reservoirs, we can build a hybrid/composite structure with cell types in different locations."

The inkjets could be used to create tissue cartilage, bone, blood vessels and even skin, but they won't be available in your local hospital for some time. As Derby points out, the technology is still in its very early stages; human trials are expected in five to ten years.

LINUX

Novell ships first Linux suite

Novell has lifted the lid on the first Linux-based server-to-desktop Linux software suite

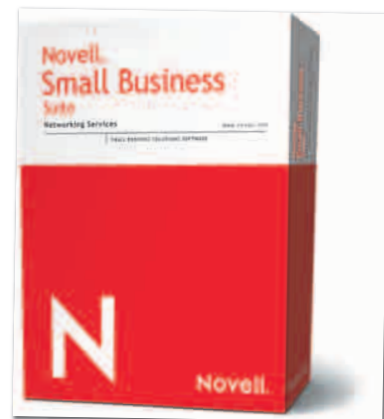
The firm says that its Novell Linux Small Business Suite 9 enables smaller firms to have the big-business benefits on a small budget. It's comprised of Linux server and desktop software along with groupware collaboration, security and management products, all engineered specifically for Linux.

The suite complements the existing NetWare-based Novell Small Business Suite 6.5, and includes networking services built on SUSE LINUX Enterprise Server 9, which covers file access and sharing, printing, firewall and remote access via virtual private networks (VPNs).

In addition to installation and configuration wizards, the suite has Novell's GroupWise collaboration software for email, calendaring,

instant messaging and junk email handling, on either Windows or Linux desktops.

The Linux Desktop package covers all the basic business needs with a web browser, word processing and presentation software. Each suite is licensed for 100 users, three servers and five free technical support incidents.



Novell's Linux Small Business Suite is built around SUSE Enterprise Server 9

Inside the walled gardens

Everyone wants their hands on your photos, your holiday videos, your thoughts and your – ahem – ‘romantic life’. **Richard Cobbett** shudders at the thought

I'm trying to decide which is more boring: Yahoo! 360, MSN Spaces or a black and white documentary on paperclip manufacture shown with the original Flemish subtitles. The first two are social networking services aimed at giving you a single, central hub on the Internet, while the third is just a hint that your blind date really isn't taking to you. All three have the same fundamental problem: trying to give you an energetic, exciting place on the web, while not noticing the soul-destroying dullness all around.

Here's the other problem. They're data vampires. They want to suck in every last byte that you have to share and lock it tightly behind their own walled gardens. None have any interest in connecting between services or mixing and matching features to give you the best of all possible worlds. As a result, you're limited to ultra-basic blogging tools and limited photo gallery support, each service's favourite IM network of choice and a million other little nips and tucks that end up being restrictions, not features.

Historically, this approach has had some merit. Hosting MP3s on your own webserver can be enough to have the plug pulled on you by over-cautious web hosts, and too many people downloading video, audio and other heavy multimedia content will soon jack up

“YOU DON’T NEED TO WORRY ABOUT KILLING YOUR SITE WITH A JUST-FOR-FUN PODCAST”

your bandwidth bill to the point where you may wish that they had. You end up looking for a dedicated host out of necessity rather than choice, even if they do want to build a wall around it. Flickr.com (now owned by Yahoo!) is superb for photos, Audioblog.com handles audio well and Myspace.com earned a whole new lease of life by pushing its online music player for bands in search of a free home. Most of the time, it's hard to see why you would want to use a service that's more interested in being your 'best friend', as opposed to one that simply does what you need.

Ourmedia.org is probably the ultimate example of a useful service. It's not a social network at all, though it features the blogs and forums for you to use it as one.

Instead, it's the latest pet project from the Internet's



Not everything on Ourmedia.org is free to use. Standard copyright rules apply to this Pearl Harbour parody.

creative community, heavily supported by the boys and girls at the Internet Archive (www.archive.org), that promises to instantly solve the age-old bandwidth problem for Internet entertainers. It's old-school Internet thinking: a service for the good of the world as a whole.

The idea is simple enough: you can upload and get perpetually free hosting and bandwidth for everything you have a right to upload. The proviso is that it be made available to everyone else who may want to access it. Or, as the site puts it, 'Whoa! That means my grandkids could see the stuff I'm publishing today!'

True, but most importantly, it means that today, anyone can see your work. You don't need to worry about killing your site with a just-for-fun podcast, nor having to turn away visitors who want to see your 3D rendered movies. Archive.org's unspecified deity-level servers can fill in the gap, while still making it possible to retrieve everything you've uploaded, rather than have it sealed up in a corporate walled garden. In the future, it even hopes to offer direct transcoding to break files out of their uploaded formats.

And yet, you just know that someone's going to pip it all to the post. Google, which already runs its own archive in the form of the Google Cache, is working on its own system for uploading and storing your video content as easily as a Gmail archive.



Richard Cobbett
richard.cobbett@futurenet.co.uk

Richard has so many comment spam killers running at www.richardcobbett.co.uk that sometimes he can't post to it

PARALLEL COMPUTERVERSE*

Hard drive bought on eBay contains nothing of interest

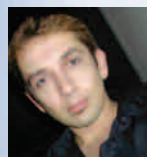
***It's as real as the jam-proof CD-ROM**

Stunned 14 year-old e-purchaser Kevin DeGrey was this month e-shocked and e-appalled to find his latest e-purchase arrive entirely formatted and ready for reuse. "WTF?!" he was seen posting on popular trawling site www.datadiving.oik, "Whrz the loot? No prn! No incider reports! Ripoff!" We laugh at his pain. Back in our day, kids walked five miles to clean our shoes and

serve us croissant in bed each morning. Now, the booming second-hand data market has all but destroyed such pleasing servitude, with experienced divers earning thousands of pounds from businesses keen on keeping their trade secrets, accidental amateur pornographers desperate not to be the next Paris Hilton, and stock market manipulation that has seen Lawnsworth School for Boys

become the majority shareholder in the city of Lower Bogeyton (Formerly Chicago).
Caveat vendor!

We remind readers that all disks should be formatted before going on the second-hand circuit, first with an electromagnet, then a sledgehammer, and a burial in salted ground where nothing will ever grow again. It's the only way to be sure.



An Eastern Eye

on the latest in hi-tech gadgets heading

Mark Lytle

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Based in Tokyo, Mark Lytle is a long-standing technology journalist and self-confessed otaku

Pantech & Curitel PH-L4000V mobile phone, 608,000 Korean Won (£320)

Sometimes we gaze across the ocean from our Tokyo HQ to the fair land of Korea and when we do, we generally see some pretty interesting technology. The latest example is a curious camcorder/cellphone hybrid from major manufacturer Pantech & Curitel. Its 2-in twisting viewfinder-cum-display makes it look distinctly like a 'corder, while its CDMA2000 chip casts it firmly in the 3G mobile mould. Although it weighs 150g, it does pack an FM tuner and transmitter; an MP3 player; 128MB of onboard memory and a 2-megapixel camera with a 2x optical zoom. The one fly in the ointment is the maximum MPEG-4 frame rate of 15fps.



Panasonic Viera flatscreen TVs, ¥160,000 – ¥650,000 (£840 – £3,420)

At its recent mega press event to announce the arrival of nine new LCD and plasma televisions, Panasonic required the help of Japanese cinema megastar Koyuki, of 'Last of the Samurai' fame. Of the six LCD-TVs

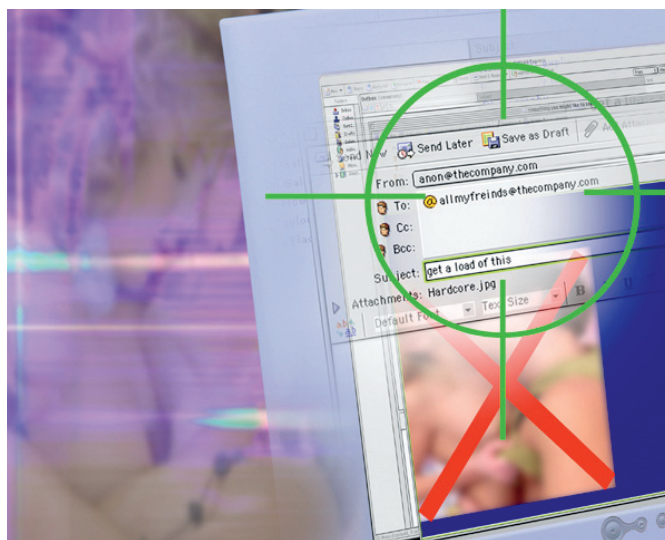
(ranging from 19 to 32in in screen diagonal), the two larger models featured an effective new technology called IPS (In-Plane Switching) that increases the viewing angle to almost 180 degrees and almost eliminates motion blur, while the plasmas (37 to 50in) all produced something approaching a true black, which is vital to home cinema systems. This is one Japanese release we know will be on our shores soon.

Sony NW-HD5 Network Walkman, ¥35,000 (£185)

At risk of boring readers, we feel obliged to report Sony's latest attempt to grab a slice of the iPod pie, simply because this one actually has a chance of success. The NW-HD5 is a 20GB hard disk machine that supports MP3, WMA, WAV and ATRAC3/plus. Its 1.5in mono LCD has the ability to orient itself in portrait or landscape modes automatically, meaning the player can be held either way. The company reckons a full battery charge will stretch to 40 hours when playing low bit-rate ATRAC files and, critically, that battery can be swapped out easily with off-the-shelf Sony replacements.



BUSINESS SECURITY



Staff email misuse puts firms in danger

UK companies are making themselves easy targets through unmonitored Internet access and web mail accounts

UK firms face a spiralling threat from inappropriate employee use of corporate email systems, a report by research company YouGov has warned. According to the study, a relaxed attitude to email in UK companies, unmonitored Internet access and a 'banter culture' mean threats are multiplying. So, if you spend a lot of work time firing funny pictures around, beware; you may be putting your company in danger.

The poll of 2,500 UK respondents found that companies needed to guard against the circulation of offensive material, the downloading of pirate software and the loss of confidential information and uninhibited use of

web mail. It didn't go into the time wasted by email-obsessed employees; presumably it took that as a given!

The survey advised that firms should restrict access to web mail. It found that almost 45 per cent of all staff use uncontrolled Internet-based mail regularly. Such relatively unrestricted web access opens companies to email-borne threats such as viruses, as well as providing an open back door for the invisible loss of confidential corporate information. Over five per cent of employees have also responded to a spam offer at work according to the study, which was conducted on behalf of content security firm Clearswift.

STOP PRESS: Adobe to buy Macromedia

Two of the largest software companies in the world are to merge. Just as we were going to press, Adobe announced that it had reached a 'definitive agreement' to buy Macromedia. This means that the company already famed for such industry-standard titles as Photoshop and InDesign will now also play host to the likes of Dreamweaver and Studio. Stephen Elop, president and CEO of Macromedia, said, "Our combined teams will be a powerful force ...".

IN BRIEF

→ Microsoft is again attempting the creation of a secure ID system, geared towards protecting files and online information. This has never gone down well in the past, with both Passport and Hailstorm dying respective deaths. Instead of online storage, this new system is stored on the user's computer, and "the end-user will be in full control", says Microsoft.

→ Podcasting is finally arriving for commercial radio. Following a successful BBC trial, where episodes of 'In Our Time' could be downloaded, radio DJs are getting in on the act with paid-downloads at www.podshows.com. "In two years' time this is the way people will consume radio," claims co-creator Daryl Denham, a DJ with Virgin Radio.

→ A round of applause for Sony for moving beyond the limitations of its own physical form to the transcendence of total rubbish. Its latest patent, on beaming signals into the human brain, a la The Matrix, has no experimental basis, no prototypes and no point. Instead, it's just that Sony thinks it might be the way interfaces will wind-up going in the future.

What's the use of PCI Express?

'The I/O standard for the next decade' is here to stay after all. Here's why and how.

Overhyped introduction and fumbled delivery. That seems to be the general consensus among industry watchers explaining why PCI Express has so far proved to be a disappointment. Similar to the introduction of the Itanium processor, the chipsets with which Intel pioneered the PCI Express technology changed too many factors all at once. The lack of an AGP port forced PCI Express adopters to throw away their existing graphics cards. The insistence on DDR2 memory, instead of the much cheaper DDR memory, made PCI Express machines based on Intel's chipsets costly to build. And, as Ben Boyden, international marketing manager for the chipset manufacturer Via puts it, for most users the high price has been accompanied by 'no tangible performance increase'.

The average punter isn't impressed by sheer technology, particularly when it relates to something like a bus system. In fact it's not just punters – one chipset manufacturer reminded me that the system builders who are his customers are looking to put together 'the minimum system for the maximum marketing bang'. Graphics apart, PCI Express doesn't deliver marketing bang. At least not yet.

You want serial ATA? Plug a card into the old PCI bus. You want eight USB 2.0 ports and perhaps a pair of FireWire connectors? Another couple of PCI cards will do it. And the existing PCI specs are more than enough to deliver surround sound, and output from something like a Nebula Freeview tuner, if like me you're cultivating your PC as an entertainment box. By sticking with tried and trusted PCI, system builders can deliver a machine that ticks all the user functionality boxes without having to spend an extra £100 on a PCI Express backbone.

There's a 'but'. Yes, the old PCI bus can service each of these high bandwidth functions individually, but what happens when you want to use them all at the same time? You're not just watching Freeview but you're also passing it over Ethernet. And while that's happening, you're downloading a video onto your hard drive ...

The PCI bus is entirely ruled by a 'traffic light' system. While data is travelling on the bus at the behest, say, of the serial ATA card, data flow owned by any of the other cards is held back. After hogging the bus for 32 microseconds the serial ATA card is obliged to hand it over to whichever card is next in the queue, and so on.

The crucial point is that you may well not notice this bandwidth timesharing in a brand new machine with only one hard drive attached to the serial ATA card, only a couple of USB ports in use, and gigabit Ethernet running in low gear to match a 100Mbps LAN. But over its lifetime that machine will make more use of peripherals – a second serial ATA drive, a USB 2.0 HDTV tuner, a video version of Skype, and gigabit Ethernet running at full blast due to upgrades to the LAN switches. Now you'll be experiencing mysterious problems. Best case, peripherals will appear to be running slower than their spec. Or there may be visible hiccups as the PCI bus traffic light system groans under the weight of requests. The worst case happens when PCI peripherals are cheating on their spec and exceeding their officially allotted timeslot to enhance their own performance (some serial ATA cards have been known to do this). PCI cards include local data buffers geared to that 32 millisecond timeslot limit. But a card that bogarts the bus obliges other cards to buffer their data beyond their design limits. Data spills out into the void, and your machine becomes unreliable.

"... THE HIGH PRICE HAS BEEN ACCOMPANIED BY 'NO TANGIBLE PERFORMANCE INCREASE'".

The killer feature of PCI Express is that it completely does away with these traffic lights. Of course, there will be bottlenecks as individual components like the hard drive mechanics max out, but the cause won't be a log-jam on the system backbone.

So how do we get from here to there? PCI Express doesn't have to be the revolution that Intel wants. A softly-softly approach is entirely feasible, and that's the route that chip manufacturers like Via are taking. Via's latest chipsets allow manufacturers to offer both kinds of graphics, AGP and PCI Express, on the same motherboards, and give them a choice of populating the memory slots either with DDR or DDR2. This way PCI Express can evolve gently into our lives. And it means that when we eventually get round to attaching all those racy new peripherals, we'll have a reliable system that functions at the speed we thought we were buying.



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Chris Bidmead has been using and writing about computers for more years than he cares to remember

OPINION



Mac Eye for the PC guy

It's hard to imagine a technology company that has had made such a remarkable turnaround as Apple. On a road to nowhere in the early 1990s, it's now blazing a trail of right through the heart of PC land. On the 29th April Apple did it again by releasing OS X 10.4 'Tiger'

a full year before Longhorn. "Others are now following OS X's taillights, and Tiger will make it even harder for them to ever catch up", bragged Steve Jobs, Apple's CEO. I don't know what they put in the coffee in Cupertino, but Mr Gates could do with a few crates of it.

NEW TECHNOLOGY

Building lasers from silicon

Intel turns to an 80-year-old idea to solve an extremely modern problem



Harry Yeates
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Harry Yeates is a chemistry graduate who has also written extensively about materials science, electronics and modern technology.

Who is Raman?

Chandrasekhara Venkata Raman was born in 1888 in the Indian state of Tamil Nadu, and graduated from the University of Madras at the age of 16, with a first class degree in both Physics and English. Although he was encouraged to pursue a research career in the UK, Raman was told he might die of tuberculosis if he did, and instead took a job with the Indian Finance Department in Calcutta. In 1917, he accepted a Professorship at the University of Calcutta, and embarked on groundbreaking research into the interaction of light with matter. His work on light scattering led to publications on the 'Raman effect' in *Nature* in 1928. He was knighted a year later, and awarded the Nobel Prize for Physics for his discovery in 1930.

It is accepted wisdom that you can't build a laser from silicon. So when Intel published research earlier this year showing it had done just that, and then went on to use the device as a technology touchstone during its March Developer Forum, it was big news.

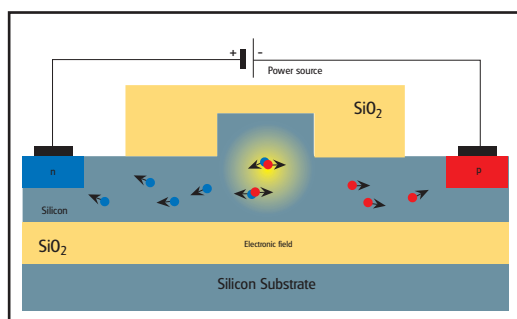
However, it doesn't mean photons are about to replace electrons as the bit-carrying vehicles within processors. It can't just be built on a chip, plugged into a power supply and start lasing away.

What it does do is promise to make various applications of lasers cheaper, and, most importantly, it shows everyone who cares that silicon can be made to emit continuous laser light.

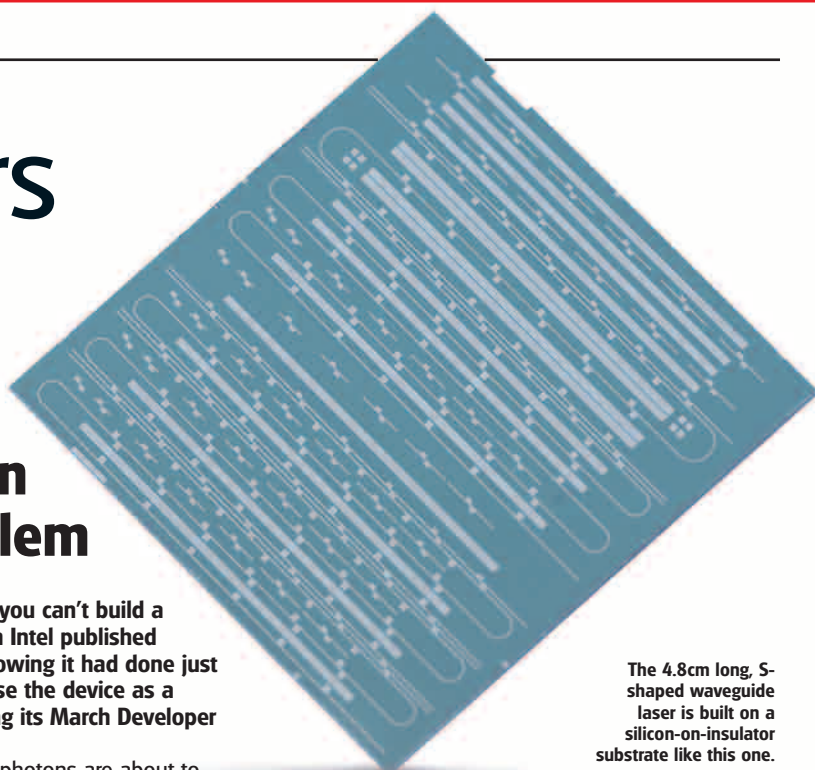
Until now, semiconductor lasers have been built out of III-V materials, such as indium phosphide and gallium arsenide, using designs where populations of electrons are forced into an unstable higher energy state, from which they fall and emit a photon. Using silicon for these devices doesn't work because its energy levels are arranged differently, and a III-V laser can't be integrated with standard silicon thanks to incompatible crystal structures. So the Intel researchers turned to a phenomenon discovered in the 1920s, known as the 'Raman effect'.

Their technique involved shining another 'pump' laser into a ridge of silicon surrounded by a layer of silica. Photons from this pump beam stimulate the emission of a lower frequency photon from silicon atoms within the ridge, or waveguide, along with a vibration in the silicon lattice – the Raman effect. Mirrors at either end of the waveguide create a laser cavity, and the difference in refractive index between the two materials keeps the light confined.

Although silicon Raman lasers have been used before, this work has attracted attention because it elegantly integrates electronics with photonics to solve a key problem – short-lived laser action.



A bias of 25v placed across the waveguide sweeps away electrons and holes, which would quench the laser action.



The 4.8cm long, S-shaped waveguide laser is built on a silicon-on-insulator substrate like this one.

This problem is caused by something called two-photon absorption (TPA), which happens when two photons simultaneously strike a silicon atom, freeing up an electron and creating a hole. These species absorb both pump and emitted photons, quenching the laser action.

Intel tackled TPA by installing what is known as a 'p-i-n diode' across the waveguide. By applying a reverse bias of 25v to this structure, electrons are swept to one terminal, and holes to another. Subsequent research has shown that the design can also be used to modulate the laser's output.

Wavelength shifting

The new take on the technology could enable on-chip wavelength shifting – one pump driving several silicon lasers working at a number of different frequencies – for more highly integrated communications chips, lower-cost instruments for biological analysis and laser surgery.

It gives access to the mid-infrared part of the spectrum, which normally would require large laboratory instruments. But despite its elegance, there are some definite limitations, the major one being that the device must be optically pumped.

"That's the big weak point of what they're doing," says Dr Keith Symington, a former member of the Optically Interconnected Computing group at Heriot-Watt University, and founder of Conjoint, a start-up developing a programmable optical interconnect. "It's got to be optically pumped, so you have to have an external laser source of some description."

The Holy Grail is a laser device that is compatible with CMOS and can be made to lase simply by connecting it to two terminals.

"Watch this space as far as that goes, we are investigating the pump issue," Justin Rattner, recently installed director of Intel's Corporate Technology Group, told us. This is an intriguing statement, because Raman amplification is a non-linear optical effect, so as long as that's the mechanism used, the device will always need another laser. Maybe there is more to come from Intel?

Let the blind see it too

Web designers have shown precious disregard when it comes to site accessibility, effectively disenfranchising millions of potential users...

I know what it's like to be denied access to buildings and services simply because no thought has been given to the needs of the less able bodied minority. Believe me, there's nothing worse than living opposite a pub serving real ale, but not being able to enter because your wheelchair won't go up the steps, or being denied access to the theatre because you are deemed a fire risk. Both these examples sound daft, but actually come from my own real world experience following a serious illness that left me in a wheelchair for six extremely illuminating years of my life. That was a decade ago, before the Disability Discrimination Act (DDA), which adds legal clout to the struggle for fair access for all. Yet for an estimated nine million disabled people in the UK, the virtual world is becoming an ever more hostile environment. The deaf, those suffering mobility problems and people with learning difficulties all demand equal attention on this issue, but it's those with visual impairment who find themselves on the front line fighting the very visual 21st century web. You may think that this is all do-good rubbish. You may want to carry on throwing Flash animations at your site, with the view that anyone who doesn't like it can try a different website. This was the exact view of a client of mine, who had no inclination to spend on access issues thank you very much. He needs to think again.

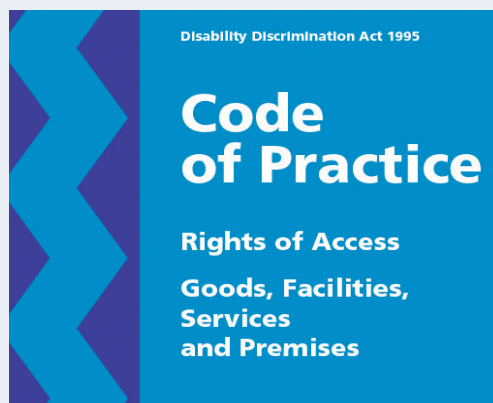
I hardly ever hear the question, "What do we need to do to make our site accessible?" being asked at consultancy meetings. Instead, it's always, "How long have we got to comply with this new law then?" When I politely explain that their time has run out already, I am met with disbelief. But it was only the last piece of the legislative DDA puzzle that became effective at the end of 2004, and this was only concerned with physical access to the premises of service providers. All the stuff that is of relevance to a web designer and websites was covered in section three, and that became law at the end of 1999 with a code of practice following in 2002. It's this latter document that's important, as it's here that websites are mentioned specifically; the law itself refers to supply of 'goods, facilities and services' in any form.

The law

The Disability Discrimination Act Code of Practice quite clearly illustrates that websites are covered by the long arm of the law: "An airline company provides a flight reservation and booking service to the public on its website. This is a provision of a service and is subject to the Act." So without even realizing it, if you have a website does provide a service to the public then you've probably been breaking the law for the last five years. You can download the entire document in PDF format free of charge from the Disability Rights Commission: www.drc.org.uk/open4all/law/code.asp.



Check the code before you code, that's my advice.



The Disability Rights Commission (www.drc-gb.org) illustrates how a badly designed site is first seen through impaired eyes and then recreated in a disability friendly fashion.

My first experience of the web came shortly after Berners-Lee unleashed it upon an unsuspecting world. It was totally text-based and access was equally text-driven, using either a command line interface or the Lynx web browser. Not that I'm suggesting the web should take such a backwards step, but perhaps a

"YOU DON'T NEED TO DESIGN FOR DISABILITY; JUST DESIGN FOR EVERYONE."

conceptual leap to accept that the web should be more about message than medium would help. And for that, dear reader, I am going to be crucified, of that I have no doubt – especially as my own www.happygeek.com is currently rather sparse on both counts. What is needed is a complete cultural sea change when it comes to web design. It shouldn't ever be about creating the coolest site, proving to your parents that those years spent getting a graphics design degree weren't all wasted on sex and drugs and HTML. A focus needs to come back into the whole design argument. Put simply, you don't need to design for disability; just design for everyone. We all want to be able to find information online quickly and simply; do you know anyone who likes playing 'hunt the link' on some page using an abstract interpretation of website navigation? I think not. If you follow an age-old design rule, any visitor to your site will be able to make the most out of your content. That marvellous rule is 'Keep It Simple, Stupid'.

There are plenty of free or low-cost tools that you can use, such as WebXACT (www.webxact.com) and Bobby (<http://bobby.watchfire.com>), so use these as a basis for improvement. I'm not advocating unreasonable expense here either – don't get Granny over and let her loose without her specs. Actually, there's a serious point to be made here web design peeps. Accessibility is about the users and their experience; not you and yours. I guess what I'm saying is that it's time to get real. Consider your customers before yourself.



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Former Technology Journalist of the Year, Davey Winder spent six years in a wheelchair and was a member of the British Computer Society Disability Special Interest Group

OPINION

This Series	Part One	Part Two	Part Three	Part Four
Writing .NET components using C#	An introduction to .NET component development	Working with properties and events	Designers and design-time issues	Working with other languages and tools

Putting it all together

PROJECT TIME



2 HRS 00 MINS

SKILL LEVEL



5 INTERMEDIATE

You should be reasonably familiar with regular .NET application development

YOU'LL NEED THIS



A .NET compatible C# development system. (Microsoft VS.NET 2003 recommended)

FILES ON SUPERDISC



All project files needed to complete this Masterclass are on the SuperDisc

This month, **Dave Jewell** concludes our look at .NET components by explaining some side issues relating to component development

Over the last few months, we've studied .NET component development with C#, finishing up last month with an encapsulation of Microsoft's playing cards DLL. This month, we conclude our .NET component tutorial by looking at additional topics, such as how to deploy your component assemblies when creating controls intended for others to use, and how to install into the Toolbox window. We also look at how to create user controls – a useful time-saving technique.

Hopefully, by now, you'll have a much better feel for what's involved in creating a usable .NET component. However, there are a number of peripheral issues that we haven't yet discussed. For example, consider the difficult business of installing your new component into the development system's Toolbox window.

It's no big deal for you, as the component developer, to set this up on your own machine, manually adding the required component to your Toolbox. However, if you're selling your shareware .NET components to a novice developer, you don't want them to fall at the first fence when it comes to installing these new goodies into VS.NET. There are two approaches you can take here. The easy way is to tell the developer exactly how to manually add the necessary components to the Toolbox window. And, if you want to go down this route, be aware that the Toolbox can

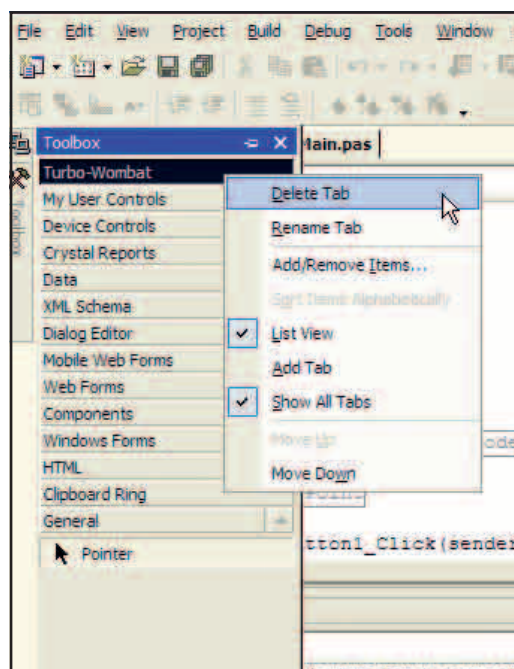
quickly get very cluttered. There are hundreds of third party .NET components around, and they can be freeware, shareware and full commercial products. I advise people to regularly re-sort their Toolbox windows so that everything is alphabetically organised. This makes life much easier. Even so, you'll want to make full use of the Toolbox's ability to support multiple tabbed pages. If you're selling a set of controls called Turbo-Wombat TCP/IP Controls, you should at least explain to your prospective purchaser how to create a new tab for the Toolbox, name it 'Turbo-Wombat' and ensure all your controls are installed there.

1 Adding components manually If you haven't done this before, here's how it works. Launch the IDE and go to the Toolbox window, right-click anywhere on the Toolbox and you'll see a pop-up context menu with an 'Add Tab' entry. Click this entry and a new tab will appear with a text insertion point for you to type in the new tab name. You probably know that you can rearrange tabs in the Toolbox window by dragging them, and if you want to rename an existing tab, right-click on the tab itself and choose 'Rename Tab' from the pop-up menu. Similarly, the same menu enables you to delete a tab you no longer need.

Previously in this column, we've covered how to add components to the Toolbox: right-click the Toolbox, select 'Add/Remove Items' and then browse to the wanted assembly (a DLL file) in the resulting dialog box. Make sure you select the '.NET Framework Components' tab of the dialog before you start. Remember here to select the destination tab on the Toolbox before going through this procedure. In other words, if you want to put the new components on the 'Turbo-Wombat' tab, then make sure this tab is the current one before bringing up the 'Add/Remove Items' menu. Once done, it's possible to move items from one tab to another, but it's better to get it right first time.

2 Automating the process That was the 'easy for you, clunky for your customer' approach! Is there a better way? As it turns out, there are ways of programmatically adding items to the Toolbox, meaning you can do it from your own code. The technique is based around access to something called the DTE object.

DTE stands for Development Tools Environment. It's a rich set of classes and interfaces that enable developers to run VS.NET on 'auto-pilot'. DTE provides access to the VS.NET automation model, which corresponds to the more familiar automation model used by Office applications. The DTE object is the root of the automation model since it's through this object that you get access to everything else, and the whole thing is wrapped up inside a special namespace: EnvDTE. You wouldn't normally want to reference this namespace from within an ordinary application, as it's really only useful for add-ins, utilities and components that need to manipulate some aspect of the development system itself.



Wouldn't it be nice if your install program could add, delete and rename tabs from the VS.NET Toolbox window automatically?

User controls – an alternative approach

Building a new control from a collection of existing .NET components

In this Masterclass, we've focused on building .NET components from scratch. However, an alternative approach is to create a kind of aggregate component that's made up from one or more existing .NET controls. Although we haven't really gone into this in any detail, it's good to know that .NET supports this facility. In fact, very often,

it's the fastest approach when you need to build something quickly.

Don't get the idea that user controls can only be 100 per cent visual. A user control aggregate can include non-visual components such as 'File Open/Save' dialogs. You can construct a user control that includes database components, or performance counters. Personally, I

think the term user control (a hangover from Visual Basic 5, which first introduced a similar facility) is something of a misnomer. Calling them 'compound controls' would be a far more descriptive term. For a great example of a user control see: <http://visualbasic.about.com/od/usingvbnet/l/aa082503a.htm>. ■



GOING FURTHER

The emphasis during the last few months has been on creating components for the WinForms environment, both visual and non visual. However, there's another important string to the .NET bow in the shape of ASP.NET. This is taking off in a big way and there are some stunning new web-based components available. Check out the various RAD component suites at www.telerik.com. These high quality components demonstrate the remarkably rich functionality that can now be implemented in a web application by exploiting the ASP.NET framework to the full.

3 Working with EnvDTE Much of the code in our little DTEDemo program is borrowed from other sources on the web, though we've restructured some of the code. We've also reworked DTEDemo to install the 'Playing Card' component we were using last time. The DTEDemo code assumes the component assembly is in a fixed place on your hard disk. It first creates a Toolbox tab called 'PC Plus' and then adds the component to this tab.

In a real-world component installation, you almost certainly wouldn't want to hard-wire any component names or tab names into your console application. A better technique is to get this information from the command line. By rewriting the console application to pick up the wanted tab name, component name and path to component assembly from the command line, you can then reuse the code in many different installation scenarios.

The code kicks off with the following couple of statements, which retrieve an object, dte, corresponding to the DTE object referred to earlier:

```
// With thanks to Shawn A Ness's weblog!
// More info here: http://weblogs.asp.net/savanness/archive/2003/04/10/5352.aspx
// Get DTE from version-indep progid (points to newest)
Type latestDTE = Type.GetTypeFromProgID("Visual Studio.DTE");
dte = Activator.CreateInstance(latestDTE) as EnvDTE.DTE;
```

The main point here is that you can't simply do this:

```
dte = new EnvDTE.DTE()
```

Well, you can ... and it may work, but the big problem is that Microsoft confused things when it moved from .NET

frameworks 1.0 to 1.1. As a result, we need to get a reference to the latest version of EnvDTE.DTE, which isn't guaranteed without using the reflection-based approach shown above.

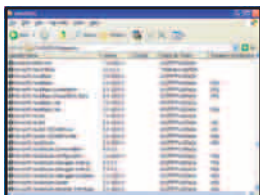
Once we've got an instance of the DTE object, the first job is to add the wanted tab to the Toolbox window. We did this by placing the tab-creation code into a new function that's called 'AddToolboxTab':

```
static EnvDTE.ToolBoxTab AddToolboxTab (string NewTabName)
{
    // Get the toolbox window
    EnvDTE.Window toolboxWindow = dte.Windows.Item(EnvDTE.Constants.vsWindowKindToolbox);
    // Get the toolbox object itself
    EnvDTE.ToolBox toolbox = (EnvDTE.ToolBox)toolboxWindow.Object;
    // Get the toolbox tabs
    EnvDTE.ToolBoxTabs toolboxTabs = toolbox.ToolBoxTabs;
    // Careful to check if our tab already exists
    foreach (EnvDTE.ToolBoxTab tab in toolboxTabs)
    {
        if (tab.Name == NewTabName)
            return null;
    }
    // tab isn't there - so add it
    return toolboxTabs.Add(NewTabName);
}
```

This routine takes the name of the wanted tab as a parameter and tries to create the tab, but it's cumbersome. First, we have to get a reference to the window we're interested in. This has to be converted to a reference to the object and then we can retrieve an object of type 'EnvDTE.ToolBoxTabs', which corresponds to the collection of tabs in the Toolbox. The code iterates through the existing list of tabs and only inserts the new tab if it isn't already there. **PCP**

NEXT MONTH

Have PowerBook, will travel! Next month, a new tutorial series on cross-platform C++ programming begins.



SHFusion.DLL is an extension to the Windows Explorer namespace. You can browse the GAC like an ordinary folder.

Deploying components and applications

A quick guide to what goes where and when, when installing your handiwork

If you're creating a simple application with no special components, you can install it into virtually any directory you want and it will work, provided that the .NET framework has been correctly installed. When an application uses one or more custom assemblies, the simplest solution is to place these assemblies into the same directory as the application itself. When done in this way, the .NET runtime will automatically load and use the assemblies as they're referenced from the application.

Since a component is just a special type of assembly, the same is true here. If you happen to be deploying an application along with one or more

custom components (either those created by you, or purchased from some other component vendor), then it's usually enough to just put them in the same directory as the application. Be warned, however, that some third party components will have licensing issues, such as the need to deploy a small licence file along with the component. Some components won't work at all without the licence file, while others will operate as runtime components but lose their design-time capabilities (which is usually good enough when deploying an end-user application).

There's another issue here, too: the dreaded GAC or Global Assembly Cache.

This is a special machine-wide repository of .NET assemblies. Ordinarily, you wouldn't want to mess with this stuff, but there are some circumstances under which it may be necessary to install your components or other assemblies into the GAC. You can find more details about it here: www.codeproject.com/dotnet/DemystifyGAC.asp

You can also download a special extension to Internet Explorer (SHFusion.DLL), which makes it possible to browse and add entries to the GAC. Just type SHFusion.DLL into www.google.com and you'll immediately find the relevant pages on MSDN. ■

This Series

Take Delphi to the
next level with
Delphi 2005

Part One

Hands on with
Delphi 2005

Hands on with Delphi 2005

PROJECT TIME

**2 HRS 00 MINS**

SKILL LEVEL

**3 BEGINNER**No experience necessary
— a whole new start

YOU'LL NEED THIS



Delphi 2005

This month, **Tim Anderson** introduces the key new language elements in Delphi 2005, the biggest change to Delphi in years

Earlier this year, Borland released Delphi 2005. It's the biggest change to hit Delphi for years, combining Delphi for Win32, Delphi for .NET and C# Builder into one IDE. There are new language elements in both versions of Delphi, and the IDE has plenty of new features, such as refactoring, local history, code snippets, and a redesigned Tool Palette. Overall, it's a great improvement, though it's spoiled by a buggy first release and high memory requirements.

Delphi 2005 brings several products together in one IDE. These include Delphi for native Win32 code, and for the .NET Framework Delphi and C# Builder. On the face of it, it's an attractive upgrade for any Delphi user. Win32 developers get a new IDE with significant enhancements, while Delphi developers moving to .NET can easily migrate their code. Unfortunately, some early adopters of Delphi 2005 ran into quality issues concerning IDE stability and performance. Win32 developers were frustrated to find that the Delphi 2005 IDE has .NET dependencies, resulting in higher resource requirements and occasionally other difficulties.

Acting with almost indecent speed, Borland has so far issued two updates, and these improve matters considerably. While the new IDE is slower and more demanding than the old, new features like refactoring and local history make it worth switching, provided your development machine is up to the task.

1 The obvious choice If you're thinking of getting hold of Delphi 2005, the next question is which edition you should purchase. This time around, Borland has made the Professional edition impressively complete, which makes it the obvious choice for most developers. You get both versions of Delphi, C# Builder, and the ability to create GUI, web and database applications. If you opt for the Enterprise version, you get better source control integration, a Star Team licence, additional dbExpress and BDPNET drivers, dbWeb controls, and Janeva for integration with J2EE or CORBA.

The Architect edition primarily adds model-driven development, with the Together UML designer, complete with two-way code synchronization, and the ECO (Enterprise Core Objects) II framework. ECO is an interesting technology that enables you to build your application as a model and have Delphi generate most of the code. Depending on your point of view, model-driven development is either the next big thing in application development, or a fascinating but futile distraction from the real business of writing code.

Although ECO is now in its second version, there are still some performance issues with the Together integration that it depends on. Some users have gone so far as to deliberately disable Together to improve performance and reduce memory usage. Overall, there's little point investing in the Architect edition unless you're seriously interested in the modelling aspect and are willing to put up with a few quirks

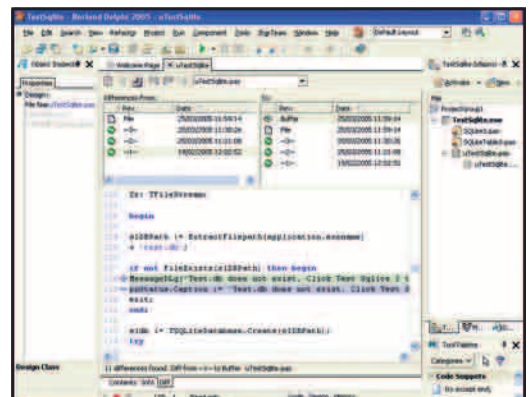
along the way. It's also worth mentioning the Optimizelt profiler, only with the Architect edition. Oddly, this is actually a Java application, but that doesn't matter if it does the job and profiling .NET applications is usually worthwhile. It's particularly important to track object creation and destruction, since despite .NET garbage collection, it's all too easy to suffer from memory leaks when objects hang around in memory, which may be due to faulty application design or even bugs in the Framework class library. Then again, there are other .NET profilers available for much less than the extra price of the Architect edition, so this isn't something to get really excited about. Now it's time for a hands-on look at some key new features in Delphi 2005.

2 The history view The history view in Delphi 2005 keeps a back-up of your changes as you work. It doesn't keep track of every edit, but keeps a copy of the old version each time you save a file. The number of copies retained is configurable in the Tools | Options | Editor Options dialog. To change it, alter the 'File Backup Limit' in this dialog. Local history is not an alternative to a Software Configuration Management (SCM) system, but works alongside it. An SCM system supports multiple users and is more powerful, but it can only record those versions that you check in, whereas local history works in the background.

To try out history for yourself, start a new project, save it, and then make some edits. Save your project again, make a few more edits, and then click the 'History' tab in the editor. This view has the following three tabs of its own:

Contents Enables you to view each revision as a complete file. It shows the last saved file as 'Local File', and each back-up as a revision with its date and time.

Info Shows comments for each revision. Not much use unless you use Borland's Star Team SCMS, in which case, you can compare local versions with versions in the repository.



The history view keeps a back-up of changes you make while working. It also lets you compare different versions of your work.

So what is Delphi?

Borland's powerful, easy to use graphical programming language. An ideal alternative to the Microsoft suite, its recent move towards .NET makes it perfect for modern Windows use.



Tim Anderson
tim@itwriting.com

Tim is a tech writer and developer who loved Delphi as soon as he saw the first beta

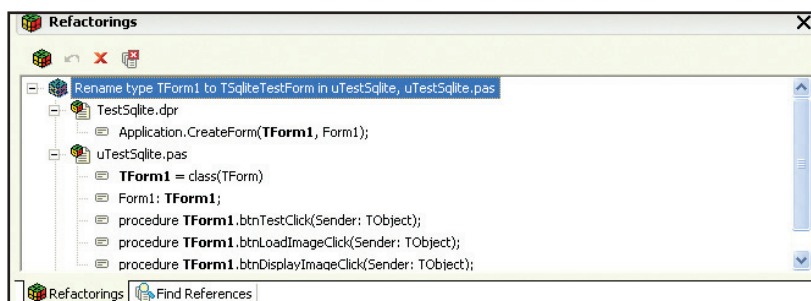
Diff This is the most powerful view, as it shows the differences between any two versions. The one called 'Buffer' is the current unsaved version. Click the 'Next Difference' or 'Previous Difference' icon to find each difference. Each added or deleted line is displayed with a chunky '+' or '-' sign.

So, what if you messed up and want to go back to an earlier version? Just choose the Contents tab, select the version you want to restore and click the 'Revert' icon.

Refactoring This is the business of improving code without changing its functionality. At first, this may sound like a strange thing to want to do, but there are many benefits. Perhaps it's the case that you wrote some code in a hurry and created an extravagantly long procedure that only you can understand. Well, in a few weeks' time, even you may have a hard time figuring it out, and the solution is to break it into several smaller procedures. Another common problem is known as 'clipboard inheritance', where large chunks of code have been copied into several different places in the project. One day, you'll find a bug in that code and forget to fix it in all the different copies. Once again, the solution is to eliminate the duplication by creating a separate procedure. This is refactoring and it's an essential part of application development.

Delphi 2005 has five different refactorings built into the IDE. The first is 'Rename', which changes the name of a Delphi element such as a type, field, variable, method or procedure. The trick here is to change it everywhere it occurs, and Delphi will do this for you without the need for 'search and replace'. 'Rename' can be invoked by placing the edit cursor in the target name, and then by selecting 'Rename' from the Refactor menu.

'Declare Variable' is more like a coding tool than a true refactoring. This comes into play when you're coding a method and find you need to use a variable that you've not



The Refactorings tab appears when you've used a feature such as 'Rename Type'. Click the cube icon to do the refactoring.

yet declared. Type it anyway and Delphi will put a red squiggly error marking under it. Click on the error and choose 'Declare Variable'. A dialog will pop up. Here, you can choose the variable type and its initial value. Click 'OK' and Delphi will add the necessary code. 'Declare Field' is similar, but it creates a field instead of a variable, and then enables you to choose the visibility.

'Extract Resource String' converts a string literal to a resource string. Place the edit cursor in the string you want to extract, choose Refactor | Extract Resource String and click 'OK' on the pop-up dialog. Your string now appears in the 'resourcestring' section of the 'implementation' section. Delphi will compile these as resources.

'Extract Method' is perhaps the most powerful refactoring of those on offer. To use it, select a block of code and choose Refactor | Extract Method. In the pop-up dialog, choose a name for the new method. Delphi then automatically creates the necessary arguments.

This is all good stuff, but Delphi isn't exactly cutting edge when it comes to refactoring. By comparison, IntelliJ IDEA, a Java IDE, offers nearly 30 refactors. Even so, it's a good start and it's already becoming a well-used feature. ➔

GOING FURTHER

Refactoring – Improving the design of an existing code

Price £33

ISBN 0201485672

Author Martin Fowler

Supplier www.amazon.co.uk

If Delphi 2005 gives you a taste for refactoring, you'll want to go beyond the built-in options. Martin Fowler's great book is a rich source of ideas. He lists over 70 refactorings, each with a concise rationale and code example. The examples are in Java, but should be readily understood by the average Delphi coder, and easily converted to Delphi or C#. This really is one of the few books that every programmer should read.

.NET pros and cons

Think you may be tempted by .NET? Read on ...

Delphi developers are typically unenthusiastic about Microsoft's .NET Framework. There are two main reasons for this. First, the great attraction of Delphi is its combination of rapid development and fast native code. Requiring the huge .NET runtime engine undermines this advantage, and .NET applications are often (but not always) slower than straight Win32 code.

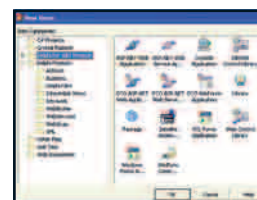
Second, Delphi already has full object orientation and a rich component library, so the provision of these features in .NET seems less compelling than it is for Visual Basic users. It's no surprise that some Delphi developers are sticking with native code.

On the other hand, there are good reasons to target .NET. The main benefit is easy access to the Framework libraries, including ASP.NET. With Delphi for .NET, you can inter-operate with other .NET code, and create assemblies that can be used easily behind Windows or web front-ends.

The .NET platform also has numerous features, including click-once deployment for making applications available on a network, and the Compact Framework for mobile devices. In the next version of Windows (codenamed Longhorn), some of the Windows API will apparently be in .NET. However, Longhorn isn't here yet, and

some of these features are not yet supported in Delphi.

The bottom line is that simply porting a Delphi desktop application to .NET brings little immediate advantage, and has several disadvantages. But where .NET development does make sense is when you want to exploit the Framework library, inter-operate with .NET components, run on ASP.NET, or look forward to future versions of Windows. Luckily, Delphi 2005 gives you the choice. In addition, much Delphi code will compile successfully for either platform without change, in contrast to the differences between Visual Basic 6 and Visual Basic .NET. ■



You can start new projects for Delphi, Delphi for .NET or C#. Note that there are major differences between the .NET and Win32 platforms.

Windows Forms or VCL.NET?

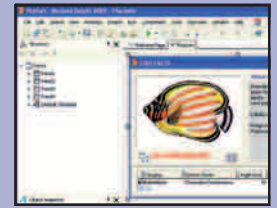
It's a difficult choice, so here are some pointers

Delphi 2005 comes with two distinct frameworks for Windows desktop applications. VCL.NET is the Delphi component library you know and love, while Windows Forms is the official .NET framework. The decision of which to use has a fair number of consequences. The big advantage of VCL.NET is compatibility with existing

code. It also generally performs better than Windows Forms. A key reason is that Borland's code uses the GDI graphics API, whereas Windows Forms wraps the GDI+ API. Video cards and drivers tend to be better optimised for GDI, resulting in snappier performance.

Unfortunately, there's a downside to VCL.NET. Controls you create in VCL.NET

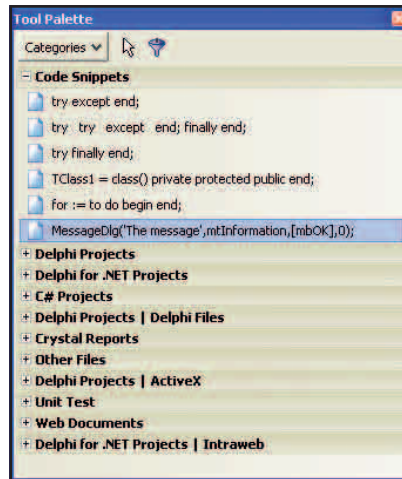
can't easily be hosted in a Windows Forms application, and vice versa. There's an import wizard that wraps Windows Forms controls for use in VCL.NET, but it doesn't always work. Most third party GUI .NET components are for Windows Forms, so choosing VCL.NET limits your options. However, VCL.NET is a large framework, so this isn't crucial. ■



VCL.NET is highly compatible with old Delphi code (even the BDE still works). But is it a wise choice for new applications?

PASSING SHOT

An informal survey of developers in Borland's official Delphi newsgroup makes interesting reading. In answer to the question, "What do you like about Delphi 2005?", the feature mentioned most often was the history view in the IDE. Next came refactoring, and only after that, the ability to use Delphi for Win32, Delphi for .NET and C# in one IDE. Other popular features were SyncEdit, the new Tool Palette, function inlining, ASP.NET, Error insight, and the 'for ... in ... do' statement. These results show how highly developers value coding tools, no doubt because writing code is still the most critical and time-consuming part of any project.

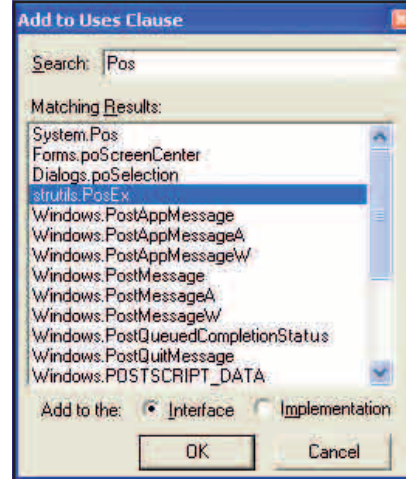


4 Code Snippets Some Delphi VCL functions are awkward to remember. One example is `MessageDlg`, but you can create a code snippet that will save time. In the Tool Palette, select the 'Code Snippets' category and type this:

```
MessageDlg('The message', mtInformation, [mbOK], 0);
```

Next, select the line and drag it to the Tool Palette while holding down [ALT]. A new code snippet is listed. Now you can drag this back to the editor whenever you need a skeleton `MessageDlg` call. Remember though, cut-and-paste is bad for your program's health.

5 SyncEdit 'SyncEdit' enables you to change multiple instances of a Delphi identifier in one go. Imagine you've written some code that includes several references to a label



Left: Code Snippets are listed in the category-based Tool Palette to drag into your code.

Right: This handy dialog will find the unit that contains the function or type you want.

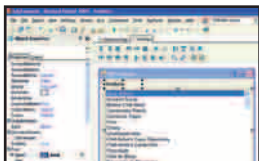
control called 'Label1'. You now realise that that this is the wrong control, and you need to change all these references to 'Label2'. Instead of doing a 'search and replace', you can use 'SyncEdit'.

Select the block of code and click the 'SyncEdit' icon that appears in the left margin. Click on any occurrence of 'Label1', change it to 'Label2' and all the other instances will be changed as well.

6 Find Unit 'Find Unit' on the Refactoring menu is the quickest method to use to locate a VCL function. Imagine you wanted to call `PosEx`, which searches a string in the same way as `Pos`, but with an option to specify the starting point of the search. Open up 'Find Unit' and type 'PosEx'. When you see the correct function, select it and choose either 'Interface' or 'Implementation'. Click 'OK' to add the relevant unit to the Uses clause in the section you chose. Incidentally, adding units to the Implementation section is preferable, because you refer to the unit's types in other Interface declarations. Moving units to the Uses clause is more efficient for the compiler, and good practice to boot. **PCP**

NEXT MONTH

We investigate ASP.NET, a superb framework for web applications that you can exploit with Delphi 2005. There will be a complete example to try and discussion of the pros and cons.



If you want features like live data at design-time in .NET, you need to use the Borland Data Provider. But be warned that third party support is limited.

Data access

It's a weird world of twists and turns

How are you meant to access data with Delphi 2005? Borland has provided a vast array of options, and knowing which to choose isn't so straightforward.

In the Win32 version of Delphi, you still have the old BDE for dBase and Paradox, dbGo for ADO, dbExpress for fast SQL access, and InterBase Express for Borland's Interbase database server. In the .NET version, you still have these four data access APIs, just as long as you choose to use VCL.NET.

However, the native data access API for .NET is called ADO.NET and is totally different from the old ADO. In Windows Forms or ASP.NET applications, you

normally use ADO.NET. There's also the Borland Data Provider (BDP.NET). This is an ADO.NET data provider that supports a variety of database servers through BDP drivers. BDP.NET offers Borland-specific features, such as live data at design-time. It also makes it easier to migrate a project from one database to another. The reason is that you can work using BDP.NET as your data provider and simply change the BDP.NET driver in order to target a different database. By contrast, data providers such as the .NET Sqlclient for SQL Server have their own set of classes, so more code changes are necessary if you want

to change to another provider. On the other hand, the number of BDP.NET drivers on offer is limited compared to those available for ADO.NET.

This means that there are two database API families in Delphi 2005 for .NET. One is aimed at compatibility, and primarily supports VCL.NET, the other is aimed at new applications. The obvious question is whether you can mix and match between the two. Never say never, but it's not particularly easy. There's a TADONETConnector component for using ADO.NET from VCL.NET, and most things are possible if you don't need data binding. ■

This Series	Part One	Part Two	Part Three	Part Four
Building a drawing program with GDI+	Introducing basic concepts, colours and simple shapes	Dragging and selecting, and altering properties	Implementing persistence	Bitmaps, rotations and transformations

GDI+ basic concepts

PROJECT TIME



3 HRS 00 MINS

SKILL LEVEL



4 INTERMEDIATE
Some .NET development experience required

YOU'LL NEED THIS



VB.NET 2005 Express Edition



<http://forum.pcplus.co.uk>

Dave Jewell explains the basic concepts of GDI+, from drawing and filling shapes, to understanding the .NET colour model

This month a new tutorial series on drawing and GDI+ graphics begins. Over the last few months, we've looked at issues such as file I/O and user interface elements. Now, working towards the ultimate goal of creating a .NET drawing/painting program with Visual Studio Express Edition, we'll concentrate on another vital element of the jigsaw. This time, we'll be covering basic GDI+ concepts, working with colours and discovering how to draw and fill simple shapes.

You won't get far in building a drawing program without understanding the underlying classes that .NET uses to draw onto the screen! So let's start by creating a new project from scratch using VS.NET C# Express Edition. I've called this project *GrafixDemo*, and it's included on this month's cover disk.

1 Meeting the Graphics class The simplest way of getting to grips with basic drawing concepts is to intercept the *OnPaint* event associated with a form. We can do this by double-clicking the *Paint* handler on the Events page of the Properties window to end up with a new *Form_Paint* method, which looks like this:

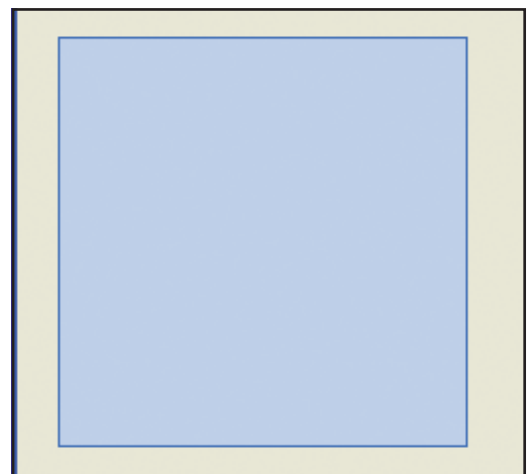
```
private void Form1_Paint(object sender,
PaintEventArgs e)
{
}
```

The key thing here is the *PaintEventArgs* parameter, which gives us a whole bunch of useful stuff relating to the painting of a form. The two most important properties surfaced by this class are:

Graphics: an instance of the *Graphics* class that implements a vast assortment of painting and drawing functionality.

ClipRectangle: a rectangle that defines where we're allowed to paint.

Ordinarily, *ClipRectangle* corresponds to the drawing surface of the form. If you try and perform a drawing operation using *x, y* coordinates that fall outside this area, then you won't see anything. In other words, any drawing you do is 'clipped' to this rectangle, hence the name.



Here's our first drawing 'object', a blue rectangle. Except that it isn't actually an object at the moment, but it will be soon.

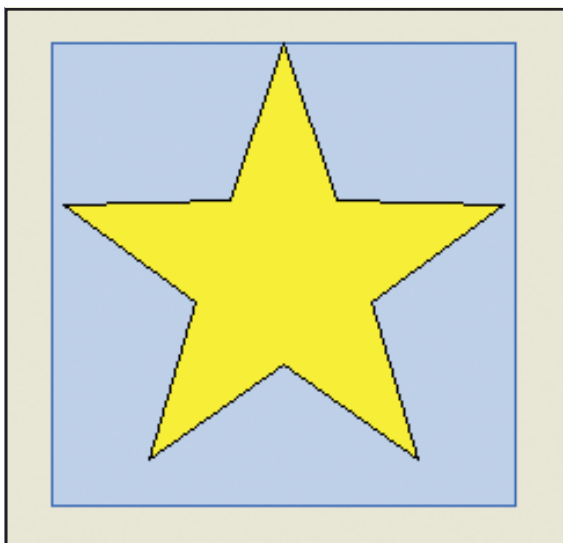
The *Graphics* class is the bit that's really interesting. It's a huge grab-bag of assorted methods that allow you to draw rectangles, lines, pies (non-edible, I'm afraid), polygons, bitmaps, icons and, of course, text. Let's take a simple example and start with a rectangle. Adding rectangle drawing code to the above *Form1_Paint* handler might look like this:

```
private void Form1_Paint(object sender,
PaintEventArgs e)
{
    Graphics g = e.Graphics;
    Rectangle blueRect = new Rectangle(20, 20, 200,
200);
    Brush b = new SolidBrush(Color.FromArgb(255,
198, 214, 239));
    g.FillRectangle(b, blueRect);
    g.DrawRectangle(SystemPens.Highlight,
blueRect);
}
```

This might look a bit overwhelming, so let's take it one step at a time. The code kicks off by getting a copy of the *Graphics* object contained inside the *PaintEventArgs* argument. We could just keep referencing it through the 'e' parameter, but it's more convenient to make a local copy.

Next, we create a *Rectangle* object called 'blueRect'. The particular form of the constructor we've used takes four arguments, the *x, y* position of the top-left corner of the rectangle, followed by the width and height respectively. This defines the size and position of the rectangle. We could just use the *ClipRectangle* field mentioned earlier, but that way the entire form would be coloured blue and it wouldn't be too obvious that we'd just drawn a distinct rectangle there!

Award yourself a gold star if you can figure out how the *DrawStar* routine works! Next, how can you modify the routine?





Dave Jewell

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Dave is an enthusiastic .NET developer, consultant, and freelance journalist. He's used everything from an ICL 1900 to a BBC Micro!

So what is Springboard ?

Ready to go beyond Masterclass but not yet into Programmer's World? Using affordable tools and easy steps, Springboard gives you the boost you need to jump to the next level.

The code then creates a new SolidBrush object with which to paint the interior of the rectangle. As the name suggests, a solid brush is made up of a single solid colour. However, GDI+ (the underlying engine around which .NET's drawing engine is based) enables you to have more interesting brushes than this.

2 Drawing and Filling rectangles The FillRectangle method of the Graphics class is used to fill the interior of the designated rectangle. Filling a shape is always done with a brush, while drawing the outline of a shape is done with a pen. I've used one of the system pens to draw the rectangle outline. The reason I chose this particular colour combination is because it's the same as that used by Windows Explorer when selecting a group of icons with the default 'Fisher Price' Windows XP colour scheme. And, I rather like it!

What about more interesting shapes? The Graphics class contains a couple of methods called FillPolygon and DrawPolygon that can be used to render polygons in GDI+. Both these methods will work with polygons of arbitrary size. You use them by passing an array of points to each routine, each point defining one of the vertices of the polygon. As an example of how to do this, I decided to award myself a gold star in the shape of a five-pointed shape. The necessary code to do this is shown below:

```
public void DrawStar(Graphics g, Rectangle
rect, Brush fill, Pen line)
{
    Point[] pt = new Point[11];
    for (int idx = 0; idx < 10; idx++)
    {
```

```
float scale = (0.6f * (idx & 1)) - 1.0f;
float theta = (2.0f * idx * (float) Math.PI) /
10.0f;
pt[idx] = new Point(
    rect.Left + (rect.Width / 2) + (int)(scale *
(rect.Width / 2) * Math.Sin(theta)),
    rect.Top + (rect.Height / 2) + (int)(scale *
(rect.Height / 2) * Math.Cos(theta)));
}
pt[10] = pt[0];
g.FillPolygon (fill, pt);
g.DrawPolygon (line, pt);
}
```

This method, DrawStar, takes four parameters, a reference to a Graphics class for drawing the star, a bounding rectangle within which the star is drawn and a brush and pen for filling the interior of the star and drawing its outline. Here's how it works. Because we're creating a five-pointed star, we actually need ten vertices, five for the points of the star and another five for the 'valleys'. Look at the screenshot to see what I mean. In addition to that, we need one last point which closes the polygon by taking us back to the first vertex. This makes a total of 11 points in all, so we define the array as being capable of holding 11 point structures.

The routine then loops through all ten vertices, calculating the x, y location of each point. If you're not a maths guru, don't worry too much about how this part of the code works. Suffice it to say that the code alternately plots points and valleys by using the scale variable to determine the distance from the centre of the star. The bigger this scale factor, then the greater the distance from the centre. Each vertex point is

PASSING SHOT

This month's demo program simply draws a fixed set of shapes and text in a fixed position on the form. Good, but not spectacular. Now that you've got a basic understanding of GDI+, next month we'll focus on 'wrapping' each shape up into a class of its own. Each class will then be responsible for rendering itself on the form. We'll then be able to add code for resizing shapes, dragging them around and implementing property dialogs. To make all this work, each shape will have to inherit from a common ancestor class that implements core functionality, thus making for an extensible architecture.

The GDI+ colour model

Understanding how to work with colour in GDI+ and .NET programming

In .NET software development, a colour value is encapsulated into an object of type Color. This is a value type, rather than a reference type. In other words, the Color type is more like a data structure than a conventional class. One of the consequences of this is that you don't need to use the new operator when creating a new Color object.

A huge collection of built-in colours (let's use the UK spelling when we're not talking about the .NET type) are predefined in the .NET framework. So, in order to create an IndianRed colour, you would do this:

```
Color IndianRed = Color.
IndianRed;
```

However, a colour on its own isn't much use. Ordinarily, you would create an

IndianRed-coloured brush, or pen, by doing the following:

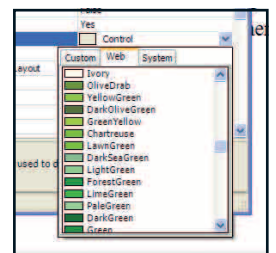
```
Brush IndianRedBrush = new
SolidBrush(Color.IndianRed);
Pen IndianRedPen = new
Pen(Color.IndianRed);
```

This works, but wouldn't it be nice if this pen and brush already existed? Well, surprise, surprise, they do. For each of the pre-defined colours, there are a corresponding pen and brush, which can be accessed like this:

```
Brushes.IndianRed
// access the built-in
IndianRed brush
Pens. IndianRed
// access the built-in
IndianRed pen
```

With Win32 programming, a colour is specified by its red, green and blue components, or channels. However, .NET is more sophisticated. It has an additional channel called the alpha channel. This controls the transparency of the colour. Ordinarily, the alpha channel has a value of 255, which represents a totally opaque colour, but it can be varied all the way down to zero for complete transparency.

In addition to the colours that have been mentioned above, .NET also has a set of colours corresponding to different elements of the Windows user interface, such as SystemColors.ButtonFace for the colour of a button, and SystemColors.Menu for a menu colour. There are equivalent SystemPens and SystemBrushes collections for each of these system colours. ■



The web-friendly .NET colours appear under the 'Web' tab of the standard colour chooser in the Properties window.



Under the Win32 programming model, you could select a pen, brush, font, bitmap or region into a device context.

Stateless vs stateful programming interfaces

Comparing Win32 GDI programming to the GDI+ API routines

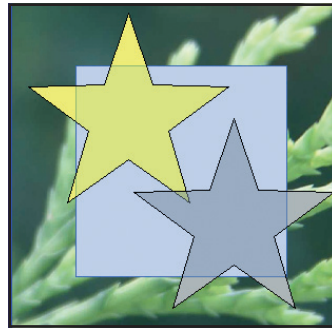
One thing you'll notice about the GDI+ methods exposed within the .NET framework is the way in which you always have to explicitly provide a pen or brush. If you've done much Win32 programming you'll know that you first have to select a brush into a device context, then you can do the drawing operation and then you select the brush

back out of the device context again. It's a major pain, and the same thing applies to pens and fonts. Nowadays, this is often called a 'stateful' (another American mutilation of the English language!) interface because the device context effectively retains state information (the selected-in drawing tools) from one call to the next.

The programming model under .NET is much simpler but you must provide a reference to the drawing tool on each call. This makes the actual drawing code look a little more complex, but it's actually a more straightforward way of doing things. And, don't forget, many subtle problems did accompany the traditional Win32 approach. ■

GOING FURTHER

Look back at the DrawStar method which, as it stands, is hard-wired to draw stars with only five points (or ten vertices). See if you can figure out how to modify the code so as to be able to draw stars with an arbitrary number of points. To do this, you'll have to look through the code and identify all the places where ten vertices are assumed. You'll also have to change the routine to take another parameter which specifies the number of points to use. If you get stuck, you can take a look at my solution which is currently commented out in this month's source code.



Set the **TransparencyKey** value to **Color**. Control to get this!

added to the array as it is calculated and the code finishes up by setting the eleventh element (mathematicians count from zero, ok?) of the array back to the position of the first vertex. It's then a simple job to call FillPolygon and DrawPolygon, just as we did when rendering the rectangle.

The result is shown in the accompanying screenshot, using Brushes.Yellow to fill the interior of the star and Pens.Black to draw the outline. If you fancy something a little more challenging, see this month's 'Going Further'.

3 Working with alpha channels As it stands, we're drawing the star using exactly the same bounds as the triangle. But what would happen if we moved the star so that it partially overlaps the rectangle? In fact, I moved the rectangle around a bit and ended up drawing two differently coloured stars instead of one, like this:

```
DrawStar(g, new Rectangle (10, 10, 200, 200),
Brushes.Yellow, Pens.Black);
DrawStar(g, new Rectangle (110, 110, 200, 200),
Brushes.LightSlateGray, Pens.Black);
```

Because we're drawing the two stars using opaque brushes, anything underneath them is completely hidden. However, one of the coolest things about GDI+ is the way in which it supports transparency. We can demonstrate this by choosing new brushes that have a value of less than 255 in the alpha channel like this:

```
Brush newBrush = new SolidBrush(SetAlpha (128,
Color.Yellow));
DrawStar(g, new Rectangle (10, 10, 200, 200),
newBrush, Pens.Black);
newBrush = new SolidBrush(SetAlpha(128, Color.
LightSlateGray));
DrawStar(g, new Rectangle (110, 110, 200, 200),
newBrush, Pens.Black);
```

I've created two new brushes based on the pre-defined Yellow and LightSlateGray colours. I also modified the alpha channel to 128 to create a translucent effect. This time round, you can see the way in which the underlying rectangle shows through underneath each of the stars. The SetAlpha method looks like this:

```
public Color SetAlpha(int alpha, Color col)
{
return Color.FromArgb(alpha, col.R, col.G, col.
B);
}
```

It's a one-line space saving routine that takes the passed colour value, col, and uses it to build a new Color structure with the specified alpha channel.

As an aside, you might like to know that it's possible to modify a WinForms form so that the entire form appears to be translucent. You can easily do this by modifying the form's Opacity property. Try a value of around 50 per cent to get a nice ghostly effect. For added coolness, take a look at a related property, TransparencyKey. This defines a colour value which is interpreted as being transparent. Any area on your form that has this value will appear to be a 'hole' on the surface of the form!

This effect was achieved by setting the TransparencyKey value of the form to Color.Control. This caused the form background to become transparent, allowing the graphics on my Windows desktop to show through. **PCP**

NEXT MONTH

We'll delve deeper into different shapes, figure out how to drag them around, and encapsulate each into a class.



The above code snippet displays this text string on the form. GDI+ text output also supports translucency effects.

Saying it with text

Exploring the rich text support provided by GDI+

GDI+ implements a comprehensive set of text display capabilities through the use of the Font class. Creating and using a new custom font is as easy as this:

```
Font f = new Font("Arial", 80,
FontStyle.Italic);
g.DrawString("Stardom!", f,
Brushes.DarkSlateBlue, new
PointF(10f, 100f));
```

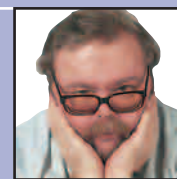
Here, the font constructor specifies that we want an Arial font, that the font size should be 80 point and that it should be created in the italic style. Once we've got this new font, we can call the

DrawString method of the Graphics class to draw a particular string at the designated point on the form. DrawString takes the string that we want to display, a reference to the font to use, a brush in which to render the font, and the location of where the string should be displayed.

Don't be fooled by the apparent simplicity of the above statements. The font constructor and the DrawString method are both heavily overloaded. You can, for example, pass an existing font reference to the Font constructor and have it create a new copy of that font but with specified changes.

But perhaps one of the sexiest aspects of GDI+ is the way in which you can pass any type of brush to the DrawString method. In this month's tutorial, we've looked only at solid brushes which, like seaside rock, are the same all the way through! However, GDI+ also supports graduated brushes that implement colour gradation, or bitmapped brushes that effectively 'tile' the inside of some shape with a particular bitmap. In the case of text, the interior of each rendered character is tiled with some image. Using these techniques, you can build some very eye-catching graphics effects. ■

This Series	Part One	Part Two	Part Three	Part Four
Making a teachable program	Building an interface that meets the needs	Basic analysis of the game	Building code that can learn	How the program can adapt to experience



Wilf Hey

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Wilf Hey has been grappling with programming for several decades now, and is always up for a game of noughts and crosses

Code that learns

PROJECT TIME



2 HRS 00 MINS

SKILL LEVEL



7 INTERMEDIATE

A strong knowledge of programming is useful

YOU'LL NEED THIS



Any programming language, but QBasic is used here for illustration purposes

Wilf Hey ponders the 'Three Laws of Robotics', and the benefits of learning to lose, to figure out the intricacies of a computer's mind...

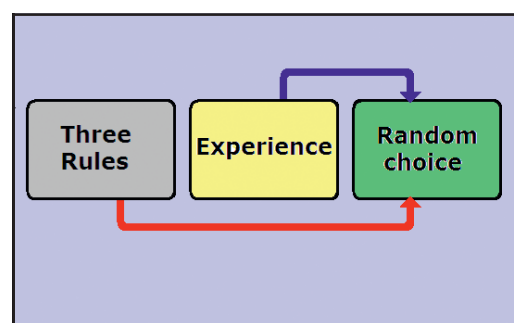
We've been looking at ways we can build rudimentary thinking into a program. My choice was to make a player of noughts and crosses, one that would learn from its own experiences and become expert. So far we've looked into some of the requirements for interface, such as how the program can communicate its knowledge, and last month we built a program that worked on a 'rule of thumb' basis, having a complete knowledge of three basic rules about the game.

1 The three rules of robotics You already knew these three rules, but they had to be carefully crafted into the programming of our player. They can be expressed as:

- 1 Take the opportunity to win when you can
- 2 Avoid losing when you know it
- 3 Adopt the chance of winning strategically, if possible

The first amounts to blocking a row that the opposing player has threatened. The second comes into effect only when the first is not necessary, and it amounts to completing a row and winning the game. The third can come into effect only when the first two don't apply. It consists of creating a jeopardy, which is threatening two rows simultaneously. Obviously, only one of them can be completed, but the opponent can block only one of them. On the next turn, the second rule will come into effect automatically, and the computer program will make the final winning move.

These three rules correspond to the famous 'Three Laws of Robotics', first formulated by John W Campbell Jr as

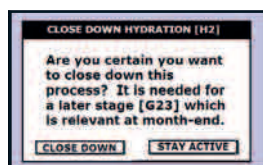


If the rules aren't applied, a record of experience is consulted. After evaluation, a move is determined by pure random choice.

background for the stories by science fiction great, Isaac Asimov. The First Law (preserve humankind) was paramount. When that was not an issue, the Second Law (serve mankind) prevailed. When neither the First nor the Second Law were in question, the Third Law (self-preservation) ruled. In Asimov's stories, these rules were programmed into the robots' positronic brains as they were assembled. And they governed their behaviour. Robots controlled by the Three Laws were safe, subservient and durable. Our three rules for moves in noughts and crosses show the same hierarchical structure. The program does not operate under a higher-numbered law until the lower-numbered laws are satisfied.

2 Getting experienced As you play with the program in the form we produced last month, you will find that it →

<http://forum.pcplus.co.uk>



A program interface can simplify access to oft-needed functions, and relegate rarely used features to a submenu.

How do I resemble thee? Let me count the ways...

Even this simple game mimics our thought process in several ways. Why, and of what use is it?

Hopefully you've seen the parallels between how your properly programmed PC can solve a problem (for example, by gaining expertise at noughts and crosses), and how we go about solving everyday conundrums.

The most probable reason for this is that programming languages in general are designed to accommodate human problems, and recreate human thinking. By modelling a quasi-human approach to playing the game, you will have followed some of the important aspects of thinking yourself.

Thinking like this about programs should at the very least lead you into better presentation habits and improve

your skill at building simple, yet human-friendly, interfaces to your programs.

When designing a problem-solving program you'll probably have a fair grip on the problem, so you mimic your solution by expressing it in the commands of your favourite computer language. Consider though, the difficulties you'd encounter designing software for use in high altitudes, or ocean depths. You don't have the solution already, so your program must seek out information and adapt its behaviour in appropriate ways.

We all have the capacity to do many things for which we have no current skill or knowledge. We just acquire skill

for the purpose as necessary. So why not program in the same way? Most programs above a certain threshold are likely to be modified in the future, so why not build 'learning skills' and cognition into those programs? There are obvious implications here for ease of operation and even safety. For example, how about leaving a program in a form that simplifies reasonable hand-coded additions?

Equipping a program to play a game at expert level is not very difficult, but underlying it is an approach to problem solving that is very valuable – an approach that may well revolutionise your computer programming. ■

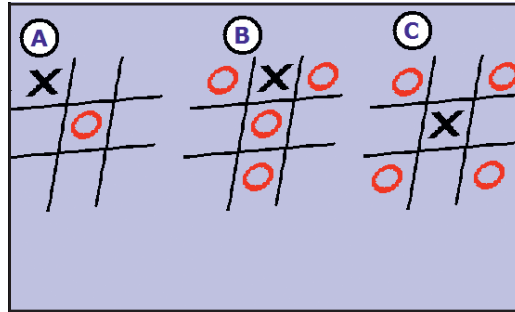
So what is Wilf's Workshop?

The art and theory of modern programming, whichever languages you use. Learn techniques that will benefit any project, and gain a deeper understanding of advanced coding disciplines.

PASSING SHOT

Once you have a noughts and crosses expert written in your own choice of language, you could think about adapting it to play variations. The 'Morris' family of games is actually closely related to noughts and crosses. The objective is simply to place your symbols in cells. But, after finishing the process you can move a symbol to a new, adjacent, cell. The first one to get three in a row is the winner. In this variant, each side has only three symbols to place.

Another variant is to place a restriction, such as "the first two cells a person marks must not be adjacent". You're on your own, so be inventive.



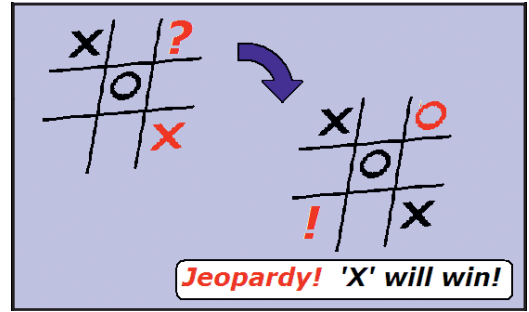
In standard noughts and crosses, there's a clear tactical move by 'O'. If 'X' and 'O' are expert, a tie can be guaranteed in all cases.

is a competent player. Hence, if you don't draw on your own experience, you'll find yourself losing much of the time. But, as yet, the program shows no sign of learning, that is getting better at its task. This involves two new factors: a method for incorporating new knowledge, and a patient opponent who will guide the program through the necessary experiences.

But where can we find our patient opponent? One scenario is that the program can play against itself. To achieve this we would have to change the interface so that two different instances of the program can communicate with each other to choose moves. It is only the interface that we would have to consider, because the program is already capable of playing 'X' (first move) or 'O'.

Alternatively, we could program a sort of imagination mode into the program. In this mode it doesn't actually play games, it simulates them internally. There's no reason the program cannot learn from these imagined games.

A third way is for you to play games against the program, relentlessly getting it into traps. This requires a certain amount of resolve, since you must play in ways that you normally wouldn't. After all, you will have to expose the program to all possible strategies that may lead to its defeat.



'O' has a choice of six moves, of which the two corners are disastrous. Should 'X' have made his second move in the corner?

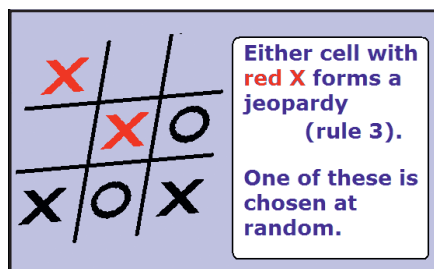
3 Guiding into all error In all three cases the program must in some way alter its behaviour. How can this happen though? There are some languages that lend themselves to self-modification through feedback, and we looked at this principle in past workshops when we considered Lisp and similar languages. The very architecture of the language is such that you build new 'words', giving them definitions based on already-known 'words'. Unfortunately, most of the languages we have for the PC don't possess such a feature, hence the program itself remains unchanging until a human steps in to supervise modification.

Procedural programming languages can simulate this kind of feedback learning. What is learned from playing a game is translated into data, then stored offline. Of course it could keep this data in memory, but as soon as the program terminates so does its online memory. A convenient way of handling things is to have an associated file containing experiential data. Another way is to store this changeable data in a database like the Registry. (No, we will emphatically not touch the Registry in this project.)

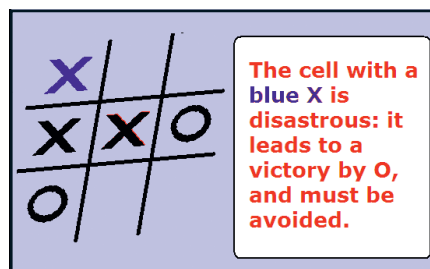
One advantage of creating off line storage is that it can be communicated to another instance of the program. So, for example, if your NANDX program has more experience than

Making mistakes, but only once

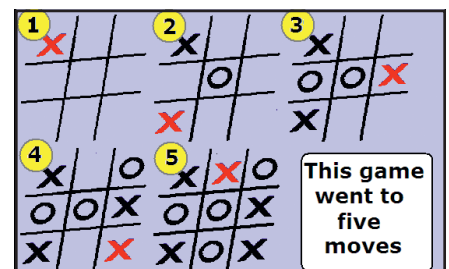
Keeping track of moves proves to be the way to ultimate



1 The noughts and crosses program encounters a configuration, and in turn tries to apply the three principal rules. If one of them applies, every possible move with the same significance is subject to random picking. This configuration need not be recorded permanently, as the three rules alone are sufficient to guide the program into the best way ahead.



2 When a configuration occurs that is not covered by the three rules, another guide must be available so that the program can evaluate a strategy for going forward. If the configuration has not been recorded, all possible moves are equally untried. A new record is set up in local memory (not yet written to disk) and a chosen move is marked.



3 The game is played just as before, with each choice of move selected at random from equally plausible moves in each configuration. Each configuration that is not resolvable by the three rules is then kept during the game. Don't be alarmed at the apparent complexity of this process – at most there are five moves (by 'X') in one game.

Changing displays

Why not show what's happening inside the program's 'mind'?

All the effort you've invested in this program needn't go to waste. Why not change the displays so that the 'inner thought' processes are clear?

We've put a lot of power beneath the surface of our noughts and crosses playing program. Not much effort is needed to change the display so that it identifies the 'thought' processes the

program undergoes as it decides on its turn. I thought of messages indicating the source of the decision: which of the three rules, and what random choice among candidate moves. It would also be instructive to identify with how many memorised configurations exist.

At the same time perhaps you could devise a statistical table showing the

results of previous games. You could have a figure showing the rate of wins over a defined number of games.

It will be interesting to see how you can change the way the program runs. As it was presented last month, it makes its decisions almost instantly, but then stops for a short period before offering the opportunity to continue. ■



My opponent has given me the opportunity to win if I use the right tactics. I will be able to force him into jeopardy.

mine, if you were to send me your program's offline storage file its experience would immediately be available to my program. When you are developing the program you may find it convenient to reset or otherwise modify this off line storage. This quick modification of memory is rather like a human 'cramming' for an examination.

It is important to remember one major difference between the education of a robot and of a human. Although you and I can learn from victory, and be encouraged by it, this is not the case with mechanised learning. Your program will learn most when it loses, because it comes to know what it must avoid. A human will advance with reward as well as with disappointment, but a robot is doomed to only learn from its mistakes. So the most effective tutor of a robot will be one who leads his charge into losing.

4 Tracking a game Let's play a game in order to see what has to be recorded, with the computer as 'X'. Although you have no way to verify it the first move of 'X' is unrestricted, so the perfect player will never lose whatever move is first. Suppose that 'X' has chosen at random to occupy the middle cell on the left side. The opponent has eight different cells from which to choose for a replying move, although you should see that there are only five responses worth considering – the other three are reflections. Let's suppose that 'O' chooses to occupy the middle cell in the top row.

In this position 'X' should assess whether any of the three rules apply. The first rule doesn't apply: there is no immediate win. Likewise the second rule is not relevant: there is no immediate threat from 'O'. Is there a move that puts 'O' in jeopardy? No. Jeopardy requires three 'X' symbols at the very least. Without more experience it would seem that there are now seven possible second moves for 'X'.

But this is not so, as some of the possible second moves for 'X' are better than others. The program will have to record, for each configuration in question, which cells are good and which bad. But remember that the brain behind the program is incapable of learning from triumph. The only useful data,

therefore, is which choices are bad.

How do we proceed? During a game, the program must look to see if it has encountered this configuration on a previous occasion. It then keeps this configuration 'open' during the rest of the game. If it loses the game, it marks this as a forbidden move on the last, most recent, configuration record. Having done this, it returns all these records back to the pool. If, however, it has removed all possible moves in the last, losing, configuration, it marks the record of the next to last configuration. If that configuration is likewise marked as all bad, the previous record is marked, and so on.

5 Unpleasant memories Whenever a configuration is marked as all bad, it is kept on record for a very good reason, as the configuration may arise in a different sequence of moves. This has one side effect that you may think odious: the program will never know when it is a perfect player (at least, not with this level of programming). The only thing you can know for sure is that the program will never repeat the same mistake. It never knows for certain whether it may stumble on a configuration already marked as bad, because there may be another route to that configuration. These unpleasant memories must be preserved, even though their records may never be dredged up again in actual play.

6 Modelling the tracking process It is a good idea to simulate the computer's actions on paper even before you build the routines that are going to handle this behaviour. As you keep a record of each configuration, choose the next move at random, and make sure you don't forget to mark it temporarily on the record. Now you've got to switch your thinking to the opponent's viewpoint. Make certain that as the opponent, you are at least intelligent enough to apply the three basic rules properly. If you think you know a winning strategy by all means use it, because that is the only way the program will ever know about it. If, and when, it loses, make the mark on the last record permanent. Have a look at the panel, 'Making mistakes, but only once'. **PCP**

GOING FURTHER

Noughts and crosses seemed ideal for this behavioural model because it is a fairly simple, easily mastered game, yet rarely totally analysed. It's surprising how complex a game becomes when you start to analyse configurations. Some years ago Martin Gardner, a mathematician, developed a simple game that owed its origins to chess. Hexapawn featured two sides, each with three pawns on one side of a three-by-three board. Pawns moved forward one square, but could only reach the other side by capturing an opponent's pawn, one ahead but diagonally. See if you can work out the progress of such a game. Is it as simple as noughts and crosses?

NEXT MONTH

We tackle the problem of the program consolidating its knowledge, and establishing just how much it does know.

success in playing a procedural game

The marked cell led to a **TIE**: this info will be kept until and unless one of the others leads to a **LOSS**

4 If the game is ultimately won by the program, no change is made to the configuration records. Any new configuration records, which are created fresh during this game, simply remain unrecorded. No further information has been gleaned from the game, and so there is no need for new records. The only significance is when the result is a tie or a loss.

This shows how varied the results can be, depending on which cell X next occupies.

5 The only exception is there must be a difference marked in configuration between ties and losses. Only the most recent configuration is rewritten with the result or, when that configuration is filled, the record before it must be marked. The program doesn't record configurations resolvable by the three rules so they are treated as if they are full records already.

10935 783 7 495

Reflected..

5103 55 15 7047

6 Remember, there is no need to keep all transformations of configurations. Each record may represent up to eight, effectively identical, configurations. Only the smallest valued configuration of each type is recorded. These configurations are valuable, even when not completely filled, as they prevent the same mistakes being made twice.



James Morris
j@tzero.co.uk

After over a decade in IT as a journalist, editor and consultant, James has found much to rant and rave about

Taking a gamble

Online betting has come of age in 2005, says **James Morris**, but it could lead to a trade war between Britain and America

Some casino websites have been around for ages, but 2005 seems to be the year the whole web betting scene is taking off. New magazines have been launched targeting the market, and many IT monthlies, and even broadsheet monthlies, have run a feature or two on the subject. Online wagering is heading for the mainstream, and it's even starting to cast off its 'less than wholesome' image.

Amid this marked rise in interest, the UK in particular could well be setting itself up as the gambling capital of the world. While the US is vainly trying to crack down on virtual bookmakers, over here we're welcoming them with open arms. And this difference in attitude could well lead to a major conflict between the two countries.

In America, state attorneys have been wielding a heavy-handed approach. While casinos are legal in many US states, and on Native American reservations, private online sites are against federal law because of their reach across state borders. The US government can't combat the majority of sites directly, as these are generally located offshore, so they're targeting local companies who do business with them instead. And they're seeing some success, with magazines and other media companies pulling ads and forfeiting millions in revenue. Chicago-based tabloid Pro Football Weekly has lost £1million by cutting web casino ads, and the US Justice Department fined PayPal £5million for doing business with online gambling sites.

But the web wagering community is already trying to fight back. Antigua won a World Trade Organisation ruling on 10 November 2004. This states that the US is violating trade agreements by allowing credit cards to be used for domestic gambling in physical casinos but not online.

Even more of a watershed will be the result of the court case between Louisiana-based Casino City and the US Justice Department. Casino City is suing the Justice Department for violation of First Amendment rights. This is the famous addition to the US Constitution that protects freedom of religion and freedom of expression, a favourite of those trying to combat government clampdowns. Censorship is a thorny subject in the US, as freedom of speech was one of the battlegrounds of the American revolution – Thomas Paine's pamphlets, and all that.

Even if Casino City loses its case, it's going to be very hard for the US to prevent its citizens from playing on offshore sites, and attacking those sites directly will mean getting embroiled in serious trade relation negotiations. Antigua is small potatoes in comparison with what might happen when the UK's deregulation plans reach fruition.

It's not hard to see why the UK is taking a different tack to the US. London's Sportingbet plc made £21million in 2003 on



Whatever your views on the morality of online gambling, the UK could well be set to make a fortune by encouraging it.

a turnover of £1.3billion. The online gambling industry is said to be worth in excess of £3.7billion annually, and will probably top £5billion by the end of 2005. Around 70 per cent of that is coming from Americans. So it's also not hard to see why the US government is so worried. With the majority of that revenue going to offshore gambling websites, up to £3.7billion could be leaving the US economy each year.

However, it's very hard to understand why the US is being so negative about online gambling. It's becoming such big business that you would think a free-market capitalist country like America would jump at the chance of encouraging this fast-growing industry. Under George Bush, though, America is leaning far more towards the political values of the 'moral majority', which has a very Christian fundamentalist point of view.

US prudishness could well be to the UK's profit. Tony Blair's government is already revamping laws regarding physical casinos, and these will undoubtedly encourage online casinos to operate within the UK rather than offshore. Industry pundits claim this will control rather than

"The online gambling industry is said to be worth in excess of £3.7billion, and will probably top £5billion by 2005"

increase problems like gambling addiction, as online casinos will then come under UK law. For example, it will be easier to prevent legitimate UK sites allowing children to register, compared to illicit organisations on a Caribbean island. The UK government could also reap a tidy profit in taxation.

Although the US may be able to ignore countries like Antigua, the UK will be a different matter. Will America risk a trade war with its major partner in the invasion of Iraq? Only time will tell, and it's certainly going to be interesting to watch what happens next. The US has made its name on the world stage partly out of bitter protection of local markets. In this case, though, it could well be a case of 'if you can't beat 'em, join 'em', because the US has the cards stacked against it. If America doesn't respond, the UK could well be the one hitting the jackpot. **PCP**

Block-UN-busted

A couple of months ago, I bemoaned how slow the TV and movie industry has been in taking advantage of the potential of the Internet for distribution (PC Plus 227, *Blockbusted*). But at least one UK TV company has got the message. By the time you read this, Channel 5 will be offering selected features from the popular Fifth Gear for download (www.7digital.com/shops/default.aspx?shop=54&refresh=1&dev). They're priced at £1.50 a pop, but there are four free samples for starters. If the Fifth Gear trial is successful, the area is sure to expand. So perhaps broadband TV is arriving at last.



Channel 5 is the first terrestrial broadcaster to offer programming commercially over the Internet.

INFORMATION

PRICE £2,290 (£1,949 ex VAT)
SUPPLIER Acer 0870 853 1000
INFO www.acer.co.uk
WARRANTY Three-years, on-site

SPECIFICATION

CPU 2x Intel Xeon 3GHz EM64T
RAM 1GB PC2700 ECC Registered DDR
CORE LOGIC Intel E7320
HDD 4x 160GB Western Digital SATA/150
HDD CONTROLLERS Embedded dual SATA/150 6-port LSI SATA RAID PCI card
NETWORK Embedded Intel Gigabit Ethernet
OTHER Acer Server Manager, EasyBUILD, Power Console software

STURDY WORKGROUP SERVER

Acer Altos G520

There's no denying Acer's expertise in the PC and laptop market, but it's only over the past year that it's been focusing heavily on promoting its server and network storage divisions. The company's entry-level servers have certainly impressed, with the budget-priced Altos G310 (see PC Plus 226) earning itself a well-deserved PC Plus Value award. Now it's time to move up to Acer's workgroup offerings and take an in-depth look at the Altos G520.

Build quality is particularly good, with the chassis looking and feeling extremely solid. Three 5.25in expansion bays are provided, beneath which is a single hard disk cage with room for four hot-swap drives. The chassis is bristling with intrusion detection switches: one for the side panel, another for the lockable door for the drive cage, and even one behind the plastic surround on the 5.25in bays. Storage options are plentiful but, to reduce costs, you can opt for the model with fixed drive bays instead. Acer offers both SCSI and SATA variants, and the price for the system on review includes no less than four 160GB Western Digital SATA/150 hard disks. The motherboard offers a pair of RAID-enabled SATA ports, but these lay idle as you get a six-port LSI Logic MegaRAID SATA RAID card included. This supports RAID-0, -1, -5 and -10 arrays, enables you to designate drives for hot-standby, and supports hot-swap.

First-time installation gets off to a flying start with Acer's EasyBUILD utility,

supplied on a bootable CD-ROM. This fires up a simple Linux-based GUI, which checks installed components and guides you through installing your operating systems. Windows users will find

EasyBUILD particularly useful because it gathers all relevant user details, checks the system, loads the required drivers and then runs an unattended installation. Acer's Server Manager (ASM) may not be as sophisticated as HP's Insight Manager or Dell's OpenManage, but it still provides a good range of tools for remote server administration and monitoring.

Plenty of information is on hand to help you monitor server configuration, performance and storage. Along with a summary of key components, you can

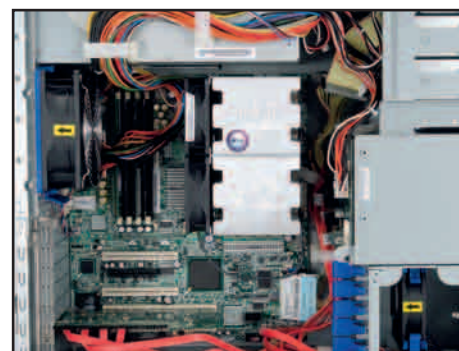
The sturdy chassis of the Altos G520 is further fortified by intrusion detection switches.

check on ports and slots, view installed drivers, services and software and keep an eye on processors, system temperatures, fans and voltages. The 'Performance' tab provides graphs of processor or memory utilisation, hard disk activity and network port traffic. The 'Storage' section is aware of the LSI Logic RAID controller, but it only provides information about logical and not physical disks. The separate 'Power Console' delivers more disk-related information, but this utility is looking old and in need of some serious graphical refreshment.

Be alert

Good alerting facilities are provided and ASM offers a wizard routine that displays all available servers and asks which ones are to be included in the alert scenario. Next, you just select the components to be monitored and whether an alert is to be sent by network message, email, audible alarm or by running another program. ASM also enables you to remotely shut down and reboot systems, but you'll need the optional IPMI baseboard management controller card if you want to control the server irrespective of its condition.

Build quality and management features are good, and a peek inside the chassis shows that the internal design and general specification don't let the side down. Acer's motherboard comes equipped with a pair of 3GHz

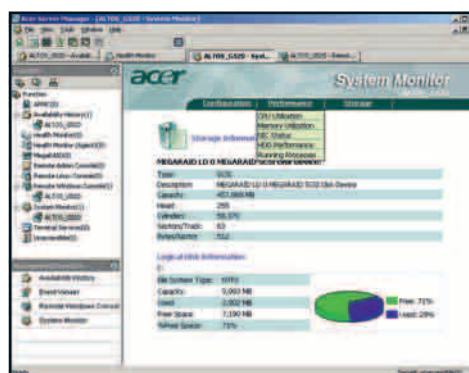


The G520's cooling arrangements keep noise down to a low level.

EM64T Xeon, and these lie underneath a pair of mighty active heatsinks completely covered by a large plastic shroud. Acer's motherboard sports an Intel E7320 chipset, which has a reduced feature-set, though it's perfectly adequate for the target market, as it provides support for up to two 4x PCI Express interfaces. Internal expansion options are reasonable, with a single 4x PCI Express slot, two 32-bit PCI slots and a pair of 64-bit slots, one of which has the SATA RAID card.

There's little to criticise about the Altos G520, because it delivers a solid server package at a sensible price. This makes it a good choice for smaller businesses that are on their way up and looking to upgrade their IT services. Remote management features may not be up with the best of them, but they're more than adequate for the target market, and power and fault-tolerant features mean that this server won't fall at the first hurdle.

Dave Mitchell



Acer also includes its ASM remote server management and monitoring software.

PCPlus ratings

ACER ALTOS G520

Value ●●●●●●●●●●
Features ●●●●●●●●●●
Performance ●●●●●●●●●●
OVERALL 8

INCREDIBLY LOW-PRICED MONITOR

ADi MicroScan S700



The S700 looks fairly stylish, but the picture quality is poor by comparison.

of Acer, BenQ, CTX or ViewSonic, for less than £200. This puts the new ADi S700 up against some fierce competition.

The S700 looks anything but cheap. It has a

If you've blinked recently and taken your steady gaze off the LCD monitor market, the new ADi S700 may seem an absolute bargain, especially when you consider that back in our LCD monitor group test of issue 226, most of the 17in monitors we featured were priced at about £300. However, since then, LCD prices in general have plummeted. Now very affordable, 19in LCDs have become the popular choice of the masses, driving the price of 17in screens even lower, to the point where you can pick up a perfectly respectable LCD from the likes

pleasant, faux brushed aluminium finish, which contrasts nicely with the black stand. The stand itself has no pivot or swivel facilities, but does at least allow for a reasonably generous degree of tilt. The stand also features a built-in stereo amplifier and speakers, although, slightly inconveniently, its use requires the addition of an extra power cable, which runs from the monitor down to the base unit. Wired for sound as well as vision, the S700 can rapidly become a little untidy around the back.

In our tests, the screen's auto-tune feature produced a sharp, interference-

free picture in the screen's native 1,280x1,024 resolution. However, other picture attributes proved much more difficult or even impossible to set up. Brightness and contrast levels had to be set to 25 per cent and 80 per cent respectively to give the best tonal range but, even at these optimum settings, black areas of test charts had a dark grey appearance and highlight areas lacked definition.

Colour rendition was the biggest disappointment. While most monitors offer a range of colour temperatures, as well as sRGB for digital photo use, the S700 has only an 'auto colour' option on the menu. Repeated use of this button returned a slightly bluish picture in our tests, which may be all right for general office programs, but not ideal for watching DVDs or image-editing.

In basic trim, the S700 has only a single analog video input, though a more expensive version of the screen is available with a digital video input as well. Either way, the thing that really lets this monitor down is its picture quality. The S700 is reasonably cheap but, these days, that's no excuse for poor contrast and colour performance.

Matthew Richards

INFORMATION

PRICE £149 (£127 ex VAT)
SUPPLIER ADi 0870 444 1895
INFO www.adiuk.com

SPECIFICATION

DISPLAY SIZE 17in
NATIVE RESOLUTION 1,280x1,024dpi
INPUTS D-Sub
VIEWABLE ANGLE 140 degrees
horizontal and vertical
PIXEL PITCH 0.264mm
RESPONSE TIME 16ms
CONTRAST RATIO 400:1
BRIGHTNESS 250cd/m2
WEIGHT 6.5Kg

PCPlus ratings

ADI MICROSCAN S700

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
OVERALL	3

CAMERA-FRIENDLY PORTABLE STORAGE

Sony HDPS-M1



You can recharge the internal lithium pack when connected to a PC via USB.

slots for both Memory Stick (standard, Duo and PRO) and Compact Flash (Type I & II, including Microdrive), but it has some of those nice Sony touches we're used to.

Sony has been slow to market a portable photo-storage device, and just when we thought it had seen sense, it decided to keep the HDD Photo Storage HDPS-M1 to itself in Japan. We can see immediately why: Sony's design and marketing teams were obviously out to lunch when the specification passed through. However, a year later, it's decided to share it with the rest of the world. And, on the whole, we're pleased it has, because not only does the M1 pack a 40GB HDD, a built-in Li-ion pack and media card

Primarily intended as portable storage, the M1 features shock-proofing for the hard disk, and it's bus-powered too, though there's a small and lightweight mains adaptor included for use at home or the office. For many potential users, the lack of a monitor and video output will be disappointing. And, as inconceivable as it sounds, this neat little box doesn't feature an LCD of any description. What it does have is a simple arrangement of four LEDs, which are actually quite effective, but it does seem like a throwback to the 1970s.

Nevertheless, it keeps things sublimely simple. A large one-touch 'copy' button adorns the top, and is accompanied by an innocuous recessed push-button confirming capacity or cancelling any back-up in progress. Once all the files are safely copied, the originals have to be deleted in-camera.

In use, we found little to grumble about. However, at either end of the device are two identical spring-loaded covers protecting the drive bays and ports, which require nimble finger-work to unlock and drop down before opening. Performance is gratifying though: copying a combination of JPEGs and RAW files at an average of 2.5MB/s from a hi-speed 2GB CF card, means around 90 secs for 225MB, for example. Sony reckons a fully charged battery should last for 60 minutes of continuous downloading. Uploading via USB 2.0 is quick as well – you can shift 1GB in under a minute. As a portable storage device for Sony users or anyone with a camera using CompactFlash, it's attractive, and as it can easily be used as a desktop hard disk. Its credibility makes it all the more appealing.

Kevin Carter

INFORMATION

PRICE £230 (£196 ex VAT)
SUPPLIER Sony Style 020 7365 2947
INFO www.sony.co.uk
WARRANTY One year

SPECIFICATION

TYPE 40GB Hard Disk
STORAGE MEDIA Memory Stick and Compact Flash Type I&II
FILE FORMATS JPEG, TIFF, RAW, AVI
DISPLAY None
INTERFACE USB 2.0
POWER Internal Lithium-ion
SIZE 135x30x92mm
WEIGHT 300g

PCPlus ratings

SONY HDPS-M1

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
OVERALL	7

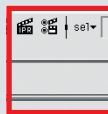
The Maya interface at a glance ...

Scene designer
The main scene design menu bar controls the tool sets that appear underneath it



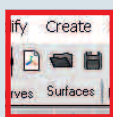
StartedLesson
Display Window

Main menu
The main menu area. This changes depending on the operating mode

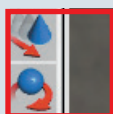


Toolbar set
The Maya toolbar set holds the tools that don't fit anywhere else. You can customise this to an extent

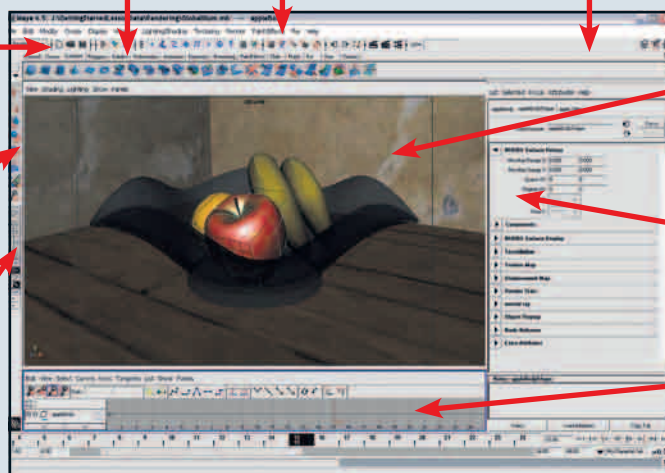
Operating mode
This feature controls whether rendering, animation, paint or other menu options are visible



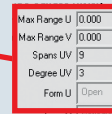
Editing tools
The master editing tools control essentials such as size, position and rotation, and keyframing



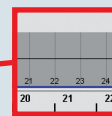
Page layout options
These hide elements of the interface, but it's easier to use a dual monitor to show everything



Preview area
The main preview area shows wireframes or quick-texture previews



Attributes editor
This lists the details of each object and shader



Keyframes
The keyframing is fairly standard, but includes useful features, like an overall timewarp tool

INFORMATION

PRICE £5,756 (£4,899 ex VAT)
SUPPLIER Alias 0149 444 1273
INFO www.alias.com

REQUIREMENTS

CPU 300MHz or faster
RAM 512MB minimum
OS Windows XP

IN A NUTSHELL

Professional 3D animation products are all monsters, and Maya is no exception. Compared to 3DS Max and Lightwave, Maya seems to have a slight edge on photorealism, which is why it's a popular choice for movie work. Newcomers will find a head-spinning learning curve that has to be climbed before animation and scene design start to reach even a basic level of fluency. But the range of effects and options available and the quality of the output makes all the effort worth it.

JAW-DROPPING 3D ANIMATION

Alias Maya Unlimited



If you ever go to the movies, you'll have seen Maya in action. It's an oversimplification to suggest that Maya lives in the movie world while 3DStudio Max is the gamer's darling, but there's an element of truth to the generalisation. One reason for this is that Maya's output can be breathtakingly realistic.

As a product range overview, the inaccurately named Maya Complete includes all the basic professional features. Maya Unlimited, reviewed here, adds cloth, fur and hair effects. Otherwise the two packages are identical. This may seem like a small difference, but the practical result is to make Maya Unlimited far more useful for character and animal animation. Maya Complete is ideal for architectural rendering and the kind of smooth-textured animation that's often used in advertising and sci-fi. It's not really up to modelling hairy faces or hairier creatures with professional accuracy.

To install Maya, you'll need a good machine. It will run on antiquated hardware (the minimum specification is a 200MHz processor) but don't expect to get anything useful out of it. The faster your processor, the better. According to Alias, 64-bit support is under review and won't appear until enough users ask for it. Graphics card support is limited to high-end professional cards. And if you think your latest ATI or Nvidia £400 slab is high-end enough, think again. Its preferred graphics card lives in a

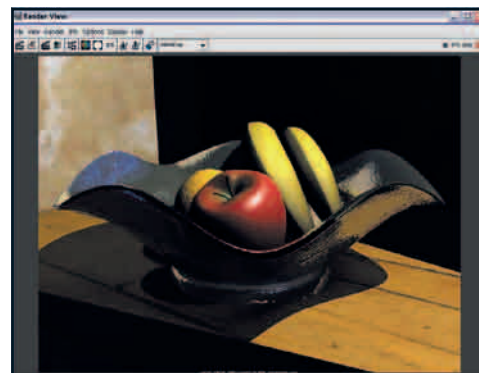
specialised workstation niche and comes with a four figure price-tag. The reason is that Maya relies on specialised features and hardware acceleration, especially for some of the painting options. This makes some previews faster, and others possible in the first place. A list of approved cards is available on the Alias website. In practice, it's possible to run Maya on more mundane graphics hardware, but there's no guarantee it will work, and some of the more useful preview and rendering features may be missing.

After installation, first impressions are that there's a maze of menus to work through. In fact, the usual collection of menus isn't enough. Right-click on an object and a set of floating menus appears. There's also a set of 15 toolbar menus, and a menu of menus that defines what appears in the main menu bar. This isn't quite as fearsome as it sounds because it's a variation on the toolbar idea. But getting used to all the options can take a while. To take the sting out of the complexity, Maya is supplied with a comprehensive set of web-based tutorials. These are installed on your hard drive and talk you through the basic elements of all the

features. This is good news, but a few tutorials seemed to be missing, and some of the rest weren't entirely accurate. Settings that were supposed to appear sometimes didn't, which will surely confuse and baffle newcomers. It also has to be said that working through the entire tutorial set still only counts as a basic introduction. For professional results, you'll need to spend time practising with Maya, and you may also need to book yourself onto a course or five.

Designing trees

The basics of rendering and animation remain simple enough. If you've used any other 3D package, you'll have transferable skills that can map over fairly quickly. The biggest difference is that Maya is more explicitly hierarchical than many other 3D packages. At the



Maya is not for the faint-hearted, but a huge investment in time and money pays off with amazingly realistic results.

simplest level, a Maya scene includes objects made of collections of polygons or procedural geometry, and shaders that define how those objects will be rendered. Both objects and shaders come with a long list of attributes, from basics such as position, size and rotation, to more obscure options that control smoothing and movement. Shaders have their own collection of attributes that determine colour, texture, transparency and other familiar details, and they can be connected to each other using a kind of network model. You can map a single colour to the surface of a sphere, but you can also map a fractal or other process that can be animated. There's a keyframe editor for making dynamic animation changes, too.

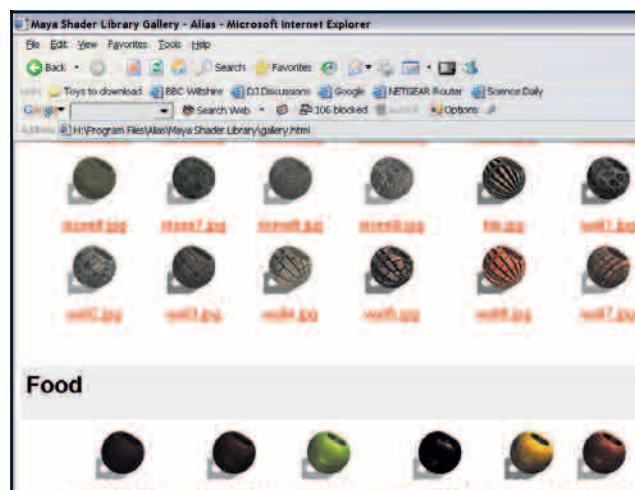
None of this is particularly challenging, but the difference in Maya is that every scene includes a tree-like structure that defines how all these details connect to each other. So to add a shader to an object, you literally connect it to the tree. This approach makes a certain intuitive sense to anyone with a background in programming. (It's also a good starting point for Maya's automation features – see the *'Introducing MEL'* box.) The downside is that even the simplest objects have hundreds of attributes and options. There's an attributes editor that shows the most useful ones, but if you try to work with one of the hierarchical views, you'll see an explosion of properties that are mostly just confusing and distracting. Linking and unlinking attributes is also a confusing and not very friendly process. The attribute editor is more like a browser with forward and back buttons, but there are times when it would be useful to see a more tree-like structure. As it is now, you have to drill down and back-up the hierarchy or

jump around from a menu, which makes it harder to keep a visual overview in your mind. In fact, this is the one criticism of Maya: many elements of the interface are lateral to the point of eccentricity. A more streamlined approach would make the complexity far more manageable. For now, it's easy to feel rather too often that you're struggling with both the feature-set and the interface at the same time.

In terms of animation options, the feature-set is outstanding. It would take a 10-page special to list all the details. A summary overview is that if you want to animate objects and characters using real-world physics models of processes like wind and gravity, you're going to be hard pressed to find more features elsewhere. There are models of waves and water, wind, skeletons with muscles, lightning, fog and so on. The cloth, fur and hair features are particularly realistic, making light work – once you've climbed the learning curve – of folds, flips and rips. Also exceptional are the built-in painting features. You can paint colours, textures and objects in both 2D and 3D, and used creatively this can go a long way to removing some of the rather sterile quality that mars the output of other 3D packages.

Power at a price

Overall, it's a measure of the complexity of professional 3D animation that movie and TV studios long ago started dividing up the workload, with one person or group working on character design, another on set design, another on animation, yet another on lighting, and so on. To get the best from Maya on your own, you would have to be expert at all of these disciplines. Realistically, unless someone has a brain the size of Jupiter, no day job and physical



Maya includes a collection of useful-ish free shaders, but they have to be installed separately. Each shader comes with its own set of attributes.

immortality, this isn't something most humans will be capable of. So as a one-off purchase, either for production work of your own or just to explore the Maya world, the price and the complexity make it a daunting proposition. If you just want to dabble, you can download Maya's Personal Learning Edition for free. It won't be capable of useful rendered output, but it will give you an insight into what the full package is capable of.

So who is Maya Unlimited aimed at? This is an unashamedly professional package with the proverbial professional price. For 3D experimentation, you're better off with something cheaper and less daunting, such as Carrera, Lightwave or even Bryce 5. But you can't really compare those packages with Maya in the same breath. It has awesome visual potential that comes at a huge cost, in both time and money. If you can find a way to make it pay for itself, it's worth every penny.

Richard Wentk

PCPlus ratings**ALIAS MAYA UNLIMITED**

Value 1 2 3 4 5 6 7 8 9 10

Features 1 2 3 4 5 6 7 8 9 10

Performance 1 2 3 4 5 6 7 8 9 10

OVERALL 9

Introducing MEL

Making it happen the Maya way, at a basic or master level

The object-oriented programming and design model really pays off in MEL, Maya's Expression Language. From an animation point of view, MEL brings Maya alive by adding intelligent procedural control of object characteristics and movement. For many projects, manual keyframing is too time-consuming, and it's much quicker and easier to let the computer handle the details under algorithmic control. This is very much the lower slope of the Peter Jackson school of animation, where you can create tens or hundreds of objects and actors and make them charge around a scene without having to worry about telling them all

individually how to behave using keyframes, which would often be unmanageably complicated.

MEL's syntax is similar to C and Java. You can create variables of all sorts up to arrays and matrices (but not arrays of arrays). You can also map these to elements in the scene in a way that changes with time. So, you could use some simple trigonometry to flex a flat plane or put a collection of animated dents into a sphere. At this level, you really are limited by your imagination, because any attribute can be animated procedurally. The difficult part is working out attribute names and assignments. A comprehensive

keyword manual is included, but the number of keywords easily runs into the thousands. The operation of many of them isn't clear unless you're already familiar with that aspect of Maya. So, put simply, it's easy to pick up the basics, but ferociously difficult to get to expert level. Some rather sketchy demonstration scripts are included, but it would be hugely useful if Alias took the time to create some more detailed tutorials. The flip side is that once MEL has been mastered, you get total software control of Maya. You can even control the interface and design your own GUI elements, turning Maya into a huge creative sandbox. ■



Welcome to keyword hell with MEL, Maya's Expression Language.

INFORMATION

PRICE £50 (£43 ex VAT)
SUPPLIER www.artext.co.uk
INFO www.artext.co.uk

REQUIREMENTS

CPU 500MHz or faster
RAM 16MB minimum
OS Windows 2000 or XP

IN A NUTSHELL

Photo to Text takes digital photos and replaces their pixels with text characters. You can then output the result in various formats, some of which seem to be more stable than others, and edit them to your heart's content.

PCPlus ratings

ARTEXT PHOTO TO TEXT 2

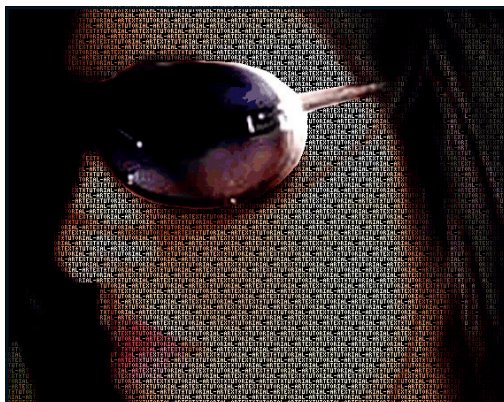
Value ●●●●●●●●●●
Features ●●●●●●●●●●
Performance ●●●●●●●●●●

OVERALL

6

UNIQUE PHOTO-EDITING

Artext Photo to Text 2



This sample from the Artext Gallery shows what can be achieved.

The basic idea behind Photo to Text is to replace the pixels in digital photographs with text. Photo to Text isn't the first software to do this but earlier applications, unexcitingly, have been limited to plain images and random text. By contrast, Photo to Text lets you insert various kinds of content (including random, upper and lower case text and binary or hex numbers) and enables you to specify the text you want to include, and a host of information about it.

The first stage is to open the photograph you want to convert. Photo

to Text strongly recommends resizing your digital pictures to around 100 pixels wide. The reason behind this is time. If you choose to use a standard-size

photo, the conversion process is likely to be quite lengthy, and the result will be too large to view comfortably. This is unsurprising since, for every single pixel in the originating photo, the program creates 12.

You can do the resizing in the basic photo-editor supplied with Photo to Text, but the results aren't very good. Unfortunately, this level of resampling in a dedicated photo-editor also gives results that are far from perfect.

However, once you've got your photo into Photo to Text, the next step is to pick the output format. In the trial

version, this can only be HTML, but the full version also allows you to select RTF or BMP. Once you've done this, it's a question of selecting a font, size and alignment and then typing in the text you want to impose on the photo. It's worth noting that you do seem to be able to insert any amount of text. You can also recolour the photo's background but, unfortunately, selecting a light colour tends to make the text harder to read.

HTML output is generally the least impressive, and is a little unprofessional. RTF output can be opened in just about any word processor and, because it consists entirely of text, can be altered in the same way as any other text document. BMP output can be opened and edited in any graphics program. All in all, there are numerous editing possibilities. However, the main difficulty lies with the 100-pixel limit. When we attempted to get round this by converting standard-size digital photos to BMP or RTF, the program either tended to hang, or produced very large and unreadable files.

Stephen Copestake

INFORMATION

PRICE £11 (£9 ex VAT)
SUPPLIER www.executive.com
INFO www.diskeeper.com

REQUIREMENTS

CPU 200MHz or faster
RAM 16MB minimum
OS Windows 9x, 2000, NT, Me, XP

IN A NUTSHELL

Diskeeper sets out to provide a comprehensive solution to the need to defragment your hard disk. You can run it manually, or undetected in the background. You can also defrag your disk at set times.

PCPlus ratings

DISKEEPER 9 HOME EDITION

Value ●●●●●●●●●●
Features ●●●●●●●●●●
Performance ●●●●●●●●●●

OVERALL

8

COMPREHENSIVE DEFRAGMENTING SOLUTION

Diskeeper 9 Home Edition



You can't beat Diskeeper 9 for clarity, and real value for money.

loading large graphics. Diskeeper maintains that a lot of the deterioration that PC systems suffer in the fullness of time is attributable to

fragmentation rather than problems with the operating system itself. And so, it claims that using Diskeeper will restore your system to the way it was when it was new.

You may well disagree with some of this, but the site does go on to make several telling points about the manifest inadequacies of the native Windows defragmenter. The main beef about this is that it leaves it to users to determine when performance has deteriorated to a point where defragmentation seems necessary. In other words, it's an entirely manual approach. The other complaint is that

on a large hard disk, it can take hours to do the job.

Diskeeper is certainly easy to use: the opening screen is a model of clarity. You can jump straight in and analyse your drive. This only takes a minute or so but, instead of the minimalist details that the Windows defragmenter gives you, you get a wide-ranging, savable and printable report listing performance, reliability and fragmentation details. Then you can either perform a manual defrag or schedule it so it runs in the background. Running Diskeeper manually is quicker than the Windows equivalent (the claim is that it's 300 to 500 per cent faster). We found that defragmenting a seriously fragmented 160GB drive (with around 30GB of data) took just over half an hour.

Probably the best option is to use the 'Set it and Forget it' feature. You can schedule defragmentation for specific times (such as every night) but you can also have it run in the background, so that Diskeeper will defrag your disk whenever it needs it. This is easy to use and completely unobtrusive.

Stephen Copestake

INFORMATION

PRICE £48 (£41 ex VAT)
SUPPLIER www.dabs.com
INFO http://uk.asus.com
WARRANTY One year

SPECIFICATION

FORMATS CD, DVD, DVD±R, DVD±RW, DVD+R DL
WRITE SPEEDS 40x CD-R, 24x CD-RW, 16x DVD±R, 6x DVD+R DL, 8x DVD±RW, 6x DVD-RW
CONNECTION Internal IDE/ATAPI
BUFFER 2MB

SPEEDY DUAL LAYER DVD REWRITER

Asus DRW-1608P



The supported formats adorn the fascia, but note the lack of volume and headphone ports.

DVD+RW media at 8x speeds.

There's a fundamental problem with such cutting-edge support though: the media isn't available to really take advantage of such figures. Media that supports 16x writing is starting to

make its way into the channel, but it's not quite in the quantities needed. The other types of media are even more scarce, particularly the more expensive rewritable formats and dual-layer discs. You'll do well to find DL discs rated for 4x writing, let alone 6x.

Thankfully, the reality isn't quite so gloomy. Most drives support writing to quality DVD media at faster than the rated speeds, and this is the case here. The DRW-1608P quite happily wrote to our test media (Plextor and Verbatim) at

12x writing speeds, equating to a burn time of seven minutes and 29 seconds. You can expect faster times if you can find compatible media, but as the NEC drive was able to write to these discs at 16x speeds, better media support is all that's needed.

The CD writing performance of the drive was also just behind the competition, with the 40x speed producing a disc in three minutes and 30 seconds. With 48x drives around, this isn't the best performer if you need to burn a lot of discs.

Asus has included a copy of Nero OEM Suite 6 in the package, along with Ulead's DVD MovieFactory 3 Suite SE. These two packages complement each other well, and provide the tools needed to produce all manner of discs. You'll also find mounting screws, a digital audio cable and IDE cable in the box, although, sadly, no media is included by default.

Overall, this is a nice bundle, but it lacks the real power needed to make it the upgrade of choice. On paper, the DRW-1608P looks amazing, but in reality it would benefit greatly from better media support.

Alan Dexter

PCPlus ratings

ASUS DRW-1608P

Value ●●●●●●●●●●
Features ●●●●●●●●●●
Performance ●●●●●●●●●●

OVERALL

7

INFORMATION

PRICE £32 (£28 ex VAT)
SUPPLIER www.dabs.com
INFO www.nec.co.uk
WARRANTY One year

SPECIFICATION

FORMATS CD, DVD, DVD±R, DVD±RW, DVD+R DL
WRITE SPEEDS 48x CD-R, 24x CD-RW, 16x DVD±R, 4x DVD+R DL, 8x DVD±RW, 6x DVD-RW
CONNECTION Internal IDE/ATAPI
BUFFER 2MB

BARGAIN DUAL LAYER DVD REWRITER

NEC ND-3520A



The price may have you thinking this is a budget drive, but it's a cutting-edge scorcher.

Installation is straightforward enough, but the moment we started using the drive, we were faced with a negative experience. This drive has the rather unhappy accolade of being the loudest burner we've ever tested. Authoring

a DVD at 16x write speeds produced a noise from the unit quite unlike anything we've ever heard. There's no fan on the back of the drive to help keep the drive cool as it does its work, so this noise is purely from the speed at which the disc is running.

The ND-3520A does shine when it comes to the rather important matter of performance, though. It quite happily wrote to our test media, officially rated for 8x writing, at 16x write speeds. This

equates to an impressive authoring time of six minutes and 20 seconds, which isn't quite the fastest score we've ever seen, but isn't far off. The 48x CD writing means you're not waiting around long for the more affordable media to pop out of the drive either: at a couple of seconds over the three minute mark, this is a quick device.

There's one feature about this drive that warrants special attention above all else, though, and that's the incredibly low price. A couple of years ago, you could have spent over a hundred pounds on a mainstream DVD writer, but today a mere £32 will buy you a drive that's near the top of the pile. Admittedly, the price quoted is for the OEM drive, which lacks the cables, screws and indeed software that are necessary to use the unit, but most of us should have these items already.

It's a shame that the drive is so loud in operation, because it's a steal at this price point. You're going to have to weigh up the performance and price against making your machine sound like a dishwasher. A quieter unit would definitely be preferable.

Alan Dexter

NEC has built an intimidating reputation for itself with its range of cutting-edge DVD writers that don't cost the earth. The ND-3520A is the latest beige box to roll off the manufacturing giant's conveyor belts, and while it isn't a major upgrade over the previous model (the ND-3500A), it does keep the drive competitive. The 16x DVD±R write speeds have been joined by support for 8x DVD+RW, 6x DVD-RW, and finally dual-layer support.

PCPlus ratings

NEC ND-3520A

Value ●●●●●●●●●●
Features ●●●●●●●●●●
Performance ●●●●●●●●●●

OVERALL

8

PRICE £999 (£850 ex VAT)
SUPPLIER Autodesk 020 7851 8000
INFO <http://usa.autodesk.com>

CPU 850MHz or faster
RAM 512MB minimum
OS Windows 2000 or later

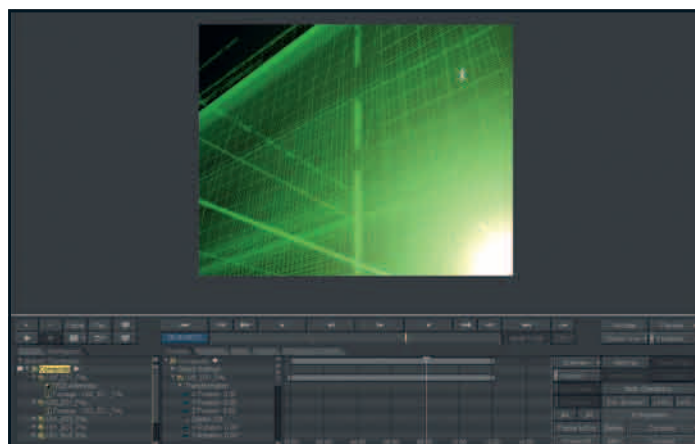
This is a competent high-end video effects and production editor with some very sweet touches. It's overkill for slicing and dicing home videos, but it offers some impressive eye candy options for corporate or music video work. However, the price is on the high side, and reliability in this release seems to be more of an issue than it should be.

Autodesk Combustion 4

Raised eyebrows aside, this update of Combustion is an attempt by Autodesk to make a play for the Adobe After Effects market. Combustion already has significant market share among editors, so this strategy makes some sense. Although you can produce very similar effects with the two products, their interfaces and working styles are very different. The After Effects interface has always been a sprawling anarchic mess of a thing. Combustion immediately gives a much more professional impression, with a solid graphite grey feel that seems serious and business-like. This isn't just window-dressing, because the interface makes a deliberate attempt to hide irrelevant details. There's never more information on the screen than there needs to be and, overall, working with Combustion feels more streamlined and more immediately responsive (and certainly less confusing).

In terms of features, Combustion includes all the basics you need to work creatively with video, and a couple of underlying extras that put it firmly into the high-end bracket. If you're used to working with Premiere, some of these options will surprise you. One of the least obvious and most important developments is 16-bit floating point

Aside from basics like colour and levels correction – both excellently



The screenshot shows the Houdini interface with the Particle Controls panel open. The 'Space Explosion 2' particle type is selected in the list. The preview window displays a bright, glowing explosion effect. The interface includes tabs for Timeline, Operators, Audio, Tracker, Particle Controls, and Preview. The Particle Controls panel has a search bar and a list of particle types. The Preview window shows the selected particle type in action, with a 'Enable Preview' button and a frame rate of 25.00.

implemented – there are also painting (rotoscoping) effects, a fine collection of blurs, grain management and other film effects, such as scratches. There's also morphing and timewarping plug-ins from the popular RE:Flex range. Combustion's particle effects are a real standout, producing gorgeous twinkly eye candy explosions, sparkles, mists and smoke. There's also keying by colours and mattes, image stabilisation to correct for shaky camerawork, and a small but useful collection of transitions. The level of detail here is impressive. For example, to create a good matte, you need to redraw it for each frame. Combustion includes Bezier and other tools that help make it much quicker and easier to do this. Text effects are also good. And, for the first time, you can now work with video in 3D – not in the holographic sense (that's still a few years off), but with the ability to move, flip and rotate video planes in full three dimensions.

Tying it all together is a hierarchical effects structure that lets you put together your own preset collections of effects and processes, called capsules. A network view option displays the connections between processes in a graphical form, which makes working out how your capsule works much more intuitive. Capsules have obvious

In the meantime, this is an excellent editor. It can't really be compared with After Effects because the two approaches are so different. Where AE is more of an open playpen, Combustion is focused clearly on working creatively with video, using a subset of industry standard techniques. If you work seriously with video it's definitely well worth a look, especially corporates who want to take their production values to the next level.



Processes can be graphed visually, so you can see immediately how different video layers and effects are related.

AUTODESK COMBUSTION 4

Features 1 2 3 4 5 6 7 8 9 10

Performance 1 2 3 4 5 6 7 8 9 10

OVERALL 8

INNOVATIVE FINANCE PACKAGE

Barclays Business Manager

Starting your own business and helping it grow can be as stressful as it is exciting, and as expensive as it is potentially rewarding. Two things are for certain: you don't want to be spending most of your time bookkeeping and sorting out your accounts, rather than doing whatever it is you do to make money, and you don't want to spend a small fortune on business software before you've got proper money flowing in. A new service from Barclays helps on both these fronts.

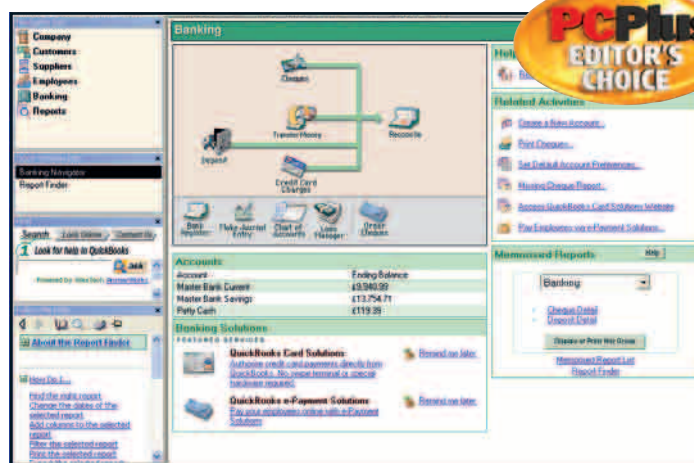
One of the main strengths of Barclays Business Manager is that, instead of paying for all your software up front, you can choose from a wide range of programs and pay a monthly subscription for the service instead. Even better news is that you get proper installation CDs to set up the software on your office computer (or computers), rather than only being able to use the software online.

It's all operated through a clever, and innovative, licence management system. This works a bit like the BSKyB subscription system; it goes online to determine which programs you're entitled to use, and only gives you access to those parts of the suite. If you don't keep up the monthly payments, it will alert you to your error, and then, after around a month, cut off your access.

Software packages to suit

Of the various packages on offer, the cheapest deal includes Clearlybookkeeping Pro, Business Plan Pro, Marketing Plan Pro and the beproStaff Compliance Service. This collection of software would normally cost over £1,200 to buy, but the Barclays subscription rate works out at £19 per month (plus VAT). The more advanced package drops the Clearlybookkeeping Pro software in favour of Sage Line 50, with the choice of either the basic Accountant version, more advanced Accountant Plus edition or the fully-fledged Financial Controller. MindLeaders Business Skills is also added to the other three programs in the more basic suite. This version of Barclays Business Manager costs from £27 per month and gives you between £1,600 and £2,200 worth of software.

There are some additional costs involved. For example, if you want the 'fully supported' version of any of the Sage products in the more advanced version of the Business Manager, you'll have to pay an additional fee of up to £30 per month. Also, if you don't have a Barclays business bank account,



The basic version of the package includes QuickBooks Pro, which comes complete with the latest BACS payment and online credit card sales facilities.



Go to <https://bbm.clearlybusiness.com/businessmanager> to take a test drive of all the software, and watch online demos.

you'll have to pay an extra £12 per month for any subscription.

Clearlybookkeeping Pro includes the legendary QuickBooks software, which makes short work of small business accounting: invoicing and recovering late payments, as well as keeping stock inventories, tracking expenditure and running a payroll system. The various levels of Sage offer more fully-fledged accounting systems and the three variants on offer make it suitable for both small and larger businesses. A nice additional touch is that you can buy a two-user account for any of the Business Manager subscriptions, which works out much less expensive than having to buy two separate subscriptions. As you'd hope, both the Clearlybookkeeping Pro and any of the Sage products enable automatic reconciliation between your company books and Barclays' online business bank accounts.

There's much more to business software than just bookkeeping and accounts, which is amply reflected in Barclays' line-up of software. Both the

basic and advanced packages include beproStaff Compliance Service, which is ideal for keeping on top of the latest HR, Health & Safety regulations. The Barclays suite provides you not only with the latest full versions of installation software, but also with access to regular updates of

the programs, to keep you up to date.

To help your business grow, both packages have Business Plan Pro and Marketing Plan Pro, from Palo Alto Software. Worth £100 each, the first of these programs makes it simple to create sales forecasts and projected profit and loss figures, as well as taking a step back and analysing the market. The Marketing Plan Pro comes with 70 sample marketing plans that you can use to raise your company's awareness in the marketplace, as well as to analyse your business, and to better know your competition.

The advanced version of Barclays Business Manager also includes MindLeaders Business Skills, which offers unlimited access to over 35 interactive business skills courses.

The basic version of the suite offers a range of high quality software, tailored to the practical needs of any small business. The advanced package is even better. It's extremely clever – one day, all software suites could be served this way.

Matthew Richards

INFORMATION

PRICE £22 per month upwards

(£19 ex VAT)

SUPPLIER Barclays 0845 601 5962

INFO <https://bbm.clearlybusiness.com>

REQUIREMENTS

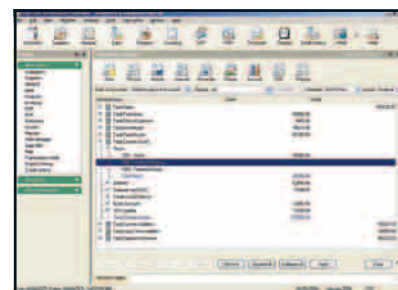
CPU 100MHz or faster

RAM 128MB minimum

OS Windows 98 or above

IN A NUTSHELL

Running a modern business can be a minefield of financial snares and legal regulations. The suite of top quality programs offered in Barclays Business Manager tackles everything head-on, from bookkeeping and accounts, through to HR and Health & Safety compliance. It also allows you to plan for growth and develop effective marketing strategies. Best of all, the monthly subscription means that you don't have to buy all the software outright.



The advanced software package drops Clearlybookkeeping Pro in favour of Sage Line 50.

PCPlus ratings

BARCLAYS BUSINESS MANAGER

Value ○○○○○○○○○○

Features ○○○○○○○○○○

Performance ○○○○○○○○○○

OVERALL 9

INFORMATION

PRICE £280 (£238 ex VAT)
SUPPLIER Jessops 0800 652 6400
INFO www.sony.co.uk
WARRANTY One year

SPECIFICATION

TYPE Digital Compact Camera
EFFECTIVE PIXELS 5.1million
APERTURE f/2.8-5.2
FOCAL RANGE 38-114mm
 (35mm equivalent)
ZOOM 3x optical
STORAGE MEDIA Memory stick
FILE FORMATS JPEG, MPEG1
DISPLAY 2.5in TFT
INTERFACE USB 2.0
POWER 2x AA

LOW-COST 5MP CAMERA

Cyber-shot DSC-W5



Without a doubt, the W5 has inherited Sony's winning formula.

This year's update to the W1, itself a cut-down version of the truly outstanding V-1, is the new W-5 (we're not sure what happened to the W3 and W4). It has a similar

specification to its predecessor, but is priced some £50 cheaper.

We're pleased to say that the W5 has kept the substantial aluminium body, the Carl Zeiss zoom lens with 3x range, and the massive 2.5in monitor. It has added 32MB of internal memory and enhanced battery life. Sony has also updated the screen, with wider viewing angles and new reflective coatings.

However, the build quality, which is good and an improvement over Panasonic's faux metal bodied FZ-1, is still some way off the original V-1. It has

somewhat boxy ergonomics, and even though the W5 favours two AA batteries, the body just isn't as compact as it could be. Put simply, this isn't what we would call a 'pocket' camera.

The classy Zeiss lens is a nice addition, but, at its longest setting (114mm) the maximum aperture decreases from a respectable f/2.8 to a disappointing and dark f/5.2. In low light, the focusing does struggle, which is why Sony has built it with an AF assist lamp.

At this point, you may be forgiven for thinking that we don't like the W5, but you would be mistaken. Despite the faults that have been mentioned, this is an immensely appealing camera. There's seriously little to dislike in speed of operation, and images are lush and awash with detail.

It's not the best 5-megapixel compact at the price – that title must go to Nikon's svelte Coolpix 5200 – but the lure of the big screen, chunky design and easy-to-follow menu make the W5 a serious rival. Undoubtedly, it will sell by the bucket load. Next up, Sony's supposed iPod killer ... can it dominate that market, too?

Kevin Carter

PCPlus ratings

CYBER-SHOT DSC-W5



INFORMATION

PRICE £1,182 (£1,389 ex VAT)
SUPPLIER www.ivojo.co.uk
INFO http://vis.mitsubishielectric.co.uk
WARRANTY Three years

SPECIFICATION

SYSTEM DDR DLP
RESOLUTION 1,024x768
BRIGHTNESS 1,800 ansi lumens
CONTRAST RATIO 2,000:1
LAMP LIFE 2,000 hours eco
AUDIO 0.5w mono speaker
SIZE 193x65x242mm
WEIGHT 1.5Kg

TRULY TINY MULTIMEDIA PROJECTOR

Mitsubishi XD60U



Mitsubishi's latest is small enough that even the tiniest of people can use it.

projector. Weighing just 1.5Kg, it could easily be lofted above his head and the supplied padded carry bag would also be handy as a

sleeping bag – what with him being too small to carry it. Connecting the projector to a laptop (using the DVI-I connection) would give him the best possible PC image quality, while S-Video and composite are also on hand for video sources.

While the tiny remote may be easy for a small person to control while jumping from button to button, we're always on the lookout for extras, such as a laser pointer or dedicated mouse controls, which are sadly lacking. The fact is, though, that it ties in well with the menu system, which, while incredibly plain-looking, is easy and

fast to navigate and has a good range of options, including an automatic white balance option.

Once set up, the unit has a slightly long throw ratio of around 1:1.85. However, the unit's 1,800-lumen output is very bright for something of this size, making sure your presentation is seen. However, one problem with this brightness level is that it's slightly on the noisy side, even with the economy mode engaged. This could make it difficult for our editor to make himself heard, with his wee tiny lungs.

Image quality from this XGA DLP unit is impressive, with no loss of focus across the screen, good colour and grey-scale gradients and scaling left text very readable, even with keystone on. In our tests, there was a little too much moiré interference than is normal, but generally, the PC performance was top notch. Unusually for a business projector, it even puts in worthy video performance with good colour, pure blacks and no noise. So, with the presentation a success, PC Plus lives to fight another day. We just need to get the boss back to normal.

Neil Mohr

PCPlus ratings

MITSUBISHI XD60U



INNOVATIVE SERVER DESIGN

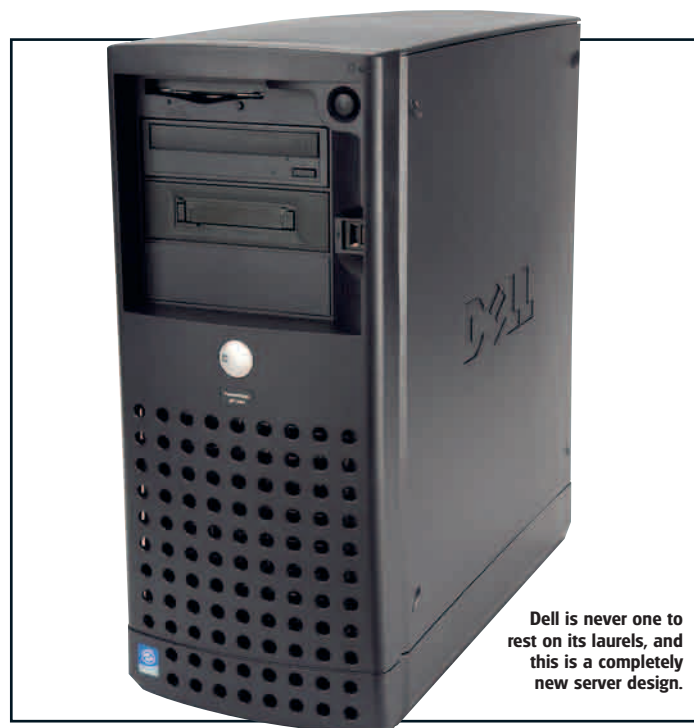
Dell PowerEdge SC1420

Dell is one of few blue chip server manufacturers that's never afraid to try out new designs. IBM, for example, has used the same boring black boxes for its entry-level and workgroup servers for many years now, while HP rarely sees fit to freshen up its lower-end server line. Dell's PowerEdge series, on the other hand, always has something new and interesting to offer.

The SC1420 is a prime example of this, because this chunky entry-level server uses an unusual clam-shell style chassis. It may not be to everyone's tastes, but it does make internal access a lot easier. Lifting the large button at the back of the side panel enables you to simply swing the two halves apart. They separate to about 50 degrees, and the disk cage and expansion bays stay in the front half, making it easier to upgrade or replace these components. Dell experimented with a similar design for its PowerEdge 400SC (PC Plus 208). On that occasion we weren't so impressed, because the chassis had to be laid on its side to be opened, and the storage ribbon cables could easily be dislodged during the process. No such problems this time, as the cables are better located and secured.

The power within

Another smart feature is the new location for the power supply. Dell has moved the entire assembly underneath the main chassis to reduce internal clutter even more. It's rated at 460W, so there's plenty of spare power on tap, and comes with a pair of dedicated cooling fans. A knock-on effect of shifting the power supply away from the motherboard is the reduced heat output around key components. In addition, the hard disks have their own fan mounted underneath and ducted to their location, while the processors are partnered by passive heatsinks and individual ducts each with its own



Dell is never one to rest on its laurels, and this is a completely new server design.

integral fan. Don't worry about all this air movement, as the SC1420 runs even quieter than the Acer Altos G520.

For the price, you're getting a good specification, which includes a single 3GHz Xeon processor and 1GB of DDR2 memory. Dual processing is supported and the sextet of DIMM sockets enables memory to be increased up to 8GB. One of the two spare 5.25in bays has been put to good use, as Dell includes an IDE DAT72 back-up tape drive. Admittedly, this isn't our favourite back-up device because, at 3MB/s, the drive is no faster than its predecessor, the ageing DDS-4, but it does offer a useful 36GB of native storage capacity.

At the time of writing, Dell was running a special promotion on this server, which included a free memory upgrade and tape drive. If you're lucky enough to catch it, then this server could be yours for only £1,033.

Dell offers the server in SCSI and SATA variants, with the former supplied for review. The price includes a pair of 73GB Seagate drives and the disk cage has room for a third. The motherboard doesn't have integrated SCSI ports, so these services are provided by an Adaptec single channel Ultra320 PCI card. Usefully, this incorporates Adaptec's HostRAID feature, which supports RAID-0 striped and RAID-1 mirrored arrays.

With the higher end Intel E7520 chipset onboard, you get a good range of expansion options, as the motherboard sports 8x and 4x PCI Express slots along with a triplet of 64-bit PCI-X slots and a single 32-bit PCI slot. Unusually, graphics aren't embedded, so you lose a slot to the basic ATi card, though Dell wasted resources by installing it in one of the 64-bit PCI slots.

Dell has decided to drop its OpenManage software suite from its entry-level products. Instead, you just get the Server Assistant, which is supplied on a bootable CD-ROM and helps with diagnostics and OS installation. The 'System Tools' section enables you to create boot floppies, prepare your hard disks and create partitions. 'Server Setup' takes you through loading either Red Hat Linux or Windows Server 2003. For the latter, it will offer to set up a system partition, after which, it will get on with checking the system, loading the required drivers and running an unattended installation.

Dell's chassis design has a number of clear benefits, but if you want decent remote server management software, check out Acer's Altos G520. The PowerEdge SC1420 is a fine candidate for SMEs looking for a general office workhorse capable of delivering reliable file, print and mail services.

Dave Mitchell

INFORMATION

PRICE £1,804 (£1,536 ex VAT)

SUPPLIER Dell 0870 152 4699

INFO www.dell.co.uk

WARRANTY Three years, on-site

SPECIFICATION

CPU Intel Xeon 3GHz EM64T

RAM 1GB DDR2-400 SDRAM

CORE LOGIC Intel E7520

HDD 2x 73GB Seagate Cheetah Ultra320

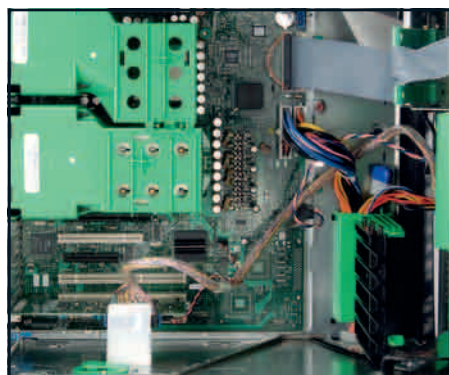
HDD CONTROLLERS Adaptec Ultra320 PCI Dual ATA/100

NETWORK Embedded Intel Gigabit Ethernet

OTHER DAT72 IDE tape drive, Dell Server Assistant software



The chassis design won't be for everyone, but you get a good specification for the price.



Tool-free access is the order of the day, so you won't need a screwdriver for maintenance or upgrades.

PCPlus ratings

DELL POWEREDGE SC1420

Value ●●●●●●●●●●

Features ●●●●●●●●●●

Performance ●●●●●●●●●●

OVERALL ●●●●●●●●●●

7

TECHNOLOGY EXCLUSIVE

Dual core CPUs

DUAL
CORE
ON TEST

After all the hype, the first dual-core processors are finally here. We put Intel and AMD's early contenders head to head to find out how they shape up

Dual-core PC processing has arrived, and not a moment too soon. After decades of relentless, even ruthless, progress, the single-core approach to engineering PC processors has finally run out of steam. Intel's baking-hot, Netburst-powered Pentium 4 CPU is as good as burnt out and even arch-rival AMD, with its lower-clocking, cooler-running K8 architecture, has conceded that the game will soon be up for single-core processors. But the future's bright, the future's multi-core, right?

If only it was that simple. Granted, with the first dual-core unveiled this month x86-compatible CPUs, we've surely entered a Brave New World of pervasive multi-core processing. That's not hype. On paper, the advantage these dual-core chips have over existing CPUs is obvious enough: twice your current processing power in a single package. But in practice, it's much more complicated.

Intel vs AMD

For starters, although most server and workstation applications are optimised to leverage the power of more than one CPU core, the existing desktop software environment is very different. Until now, no one knew how these new chips, built for multi-threaded performance, would perform with mainly single-threaded desktop software. Equally, it was unclear just how important the availability of a second processor core would be for multi-tasking, not to mention difficult to quantify metrics, such as overall system responsiveness.

AMD's first dual-core offering, the Opteron 800 series, is built explicitly for server platforms, and is well-suited to the two-way CPU, 'quad-core' setup seen here. Athlon 64 X2 desktop CPUs are expected in June.



Intel is first to bring dual-core processing to the desktop. Standard LGA775 packaging will apply although new chipset requirements make current motherboards redundant.

Fortunately, PC Plus can exclusively reveal the first head-to-head between these important new CPU architectures, including full technical details and our exhaustive performance analysis. And the bad news for heavyweight Intel is that its smaller, nimbler nemesis has once again danced around its lumbering defences and landed a knockout punch. Put simply, we think AMD's efficient and elegant dual-core architecture makes Intel's effort look like it was phoned in from the designers at the very last minute.

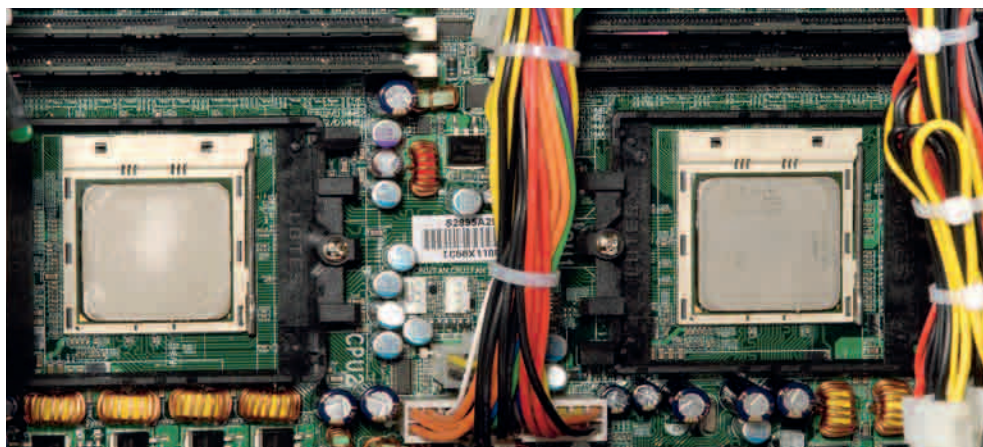
So how has AMD pulled off this remarkable feat? Well, although AMD deserves credit for its clever chip design, Intel must shoulder some responsibility for the tight spot it currently finds itself in. Let anyone forget, in 2002 it confidently predicted the Netburst architecture, which

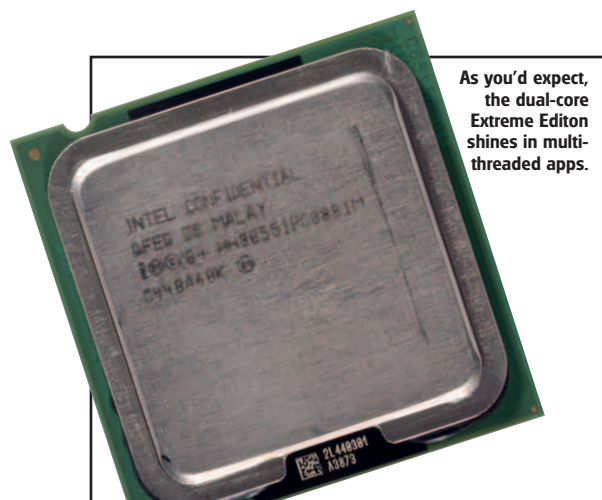
underpins both the Pentium 4 and Xeon processor lines would reach 10GHz. And for a while, few doubted it. During a frantic period spanning less than two years, it was full-speed ahead as the deeply pipelined Pentium 4 scaled from around 1.5GHz to over 3GHz. Then came the Prescott revision of the Pentium 4, manufactured using Intel's latest 90nm manufacturing process, and the wheels fell off the clockspeed machine. It arrived late, ran hot, guzzled power and barely beat Northwood in terms of clock frequency. Originally slated to reach as much as 5GHz, Intel has given up the chase at just 3.8GHz. Meanwhile, the next instalment in the Netburst dynasty, known internally at Intel as Tejas, has been cancelled, possibly marking the end of the Netburst experiment.

Intel's approach

Since then, Intel has been rapidly shifting its emphasis, both in terms of the designs of its chips and the way it markets them, from clockspeed to features: "Adding value beyond GHz," as Intel's technical guru Pat Gelsinger has put it. And the new Pentium Extreme Edition 840 D dual-core processor previewed here and its accompanying 855X chipset is the latest piece of this hastily assembled puzzle.

Although based on a brand new processor die, codenamed Smithfield, the inner workings of Intel's first dual-core chip are not exactly novel. Best thought of as a pair of standard Prescott-trim Pentium 4 CPU cores





As you'd expect, the dual-core Extreme Edition shines in multi-threaded apps.

PERFORMANCE ANALYSIS

3.2GHz Intel Pentium Extreme Edition 840 D

PRICE GUIDE £500 to £600

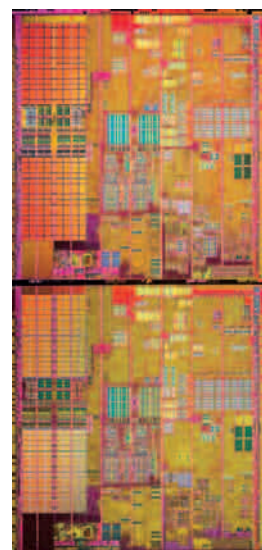
Let's get the worst news out of the way first. Single-thread performance is conspicuously down compared with Intel's highest clocking single-core processor, the 3.8GHz Pentium 4. In every single-threaded application we tried, from games to photo editing and media encoding, the numbers are exactly what you'd expect from a 3.2GHz single core Prescott Pentium. So that's fast but a fair bit off the pace of the very best. That's no surprise given the 600MHz clockspeed deficiency of this

3.2GHz processor and the fact single threads can only be processed by one CPU core. It's also disappointing to see that the 667MHz DDR2 memory support goes to waste. Thanks to the carry-over 800MHz FSB bus and some rather tardy CAS latency timings, there's less bandwidth on offer than on Intel's existing DDR2 533MHz platform.

But don't go thinking it's all doom and gloom. In multi-threaded applications, the true potential of this dual-core chip shines through. Take our Paintshop Pro and Photoshop tests. The script we ran in the former is clearly single-threaded, with the Pentium Extreme Edition failing to impress. However, the single-core 3.8GHz P4 required a full one minute and seven seconds compared to a scant 42 seconds for the dual-core Pentium to complete our multi-threaded Photoshop script. It's a similar story in other multi-threaded applications, and that includes freely available software such as Windows Media Encoder and iTunes.

We also ran the Extreme Edition through our full suite of tests with HyperThreading disabled to see whether it was worth paying that \$1,000 premium price over the rest of the dual-core Pentium range. The results were intriguing to say the least. As you might expect, it was slower in most multi-threaded tests. But it was actually faster in Windows Media Encoder. This anomaly is likely to be due to problems with the way Windows XP handles thread management. Intel assures us a patch will be available soon.

Overall, however, the most striking observation regarding how the Pentium Extreme Edition performs isn't the fact that the dual-core Opteron 875 is faster, although that's significant enough. The main thing is the fact that the Opteron 875 also scales better in every one of our real-world, multi-threaded applications. Enough said.



The first dual-core offering from Intel boasts HyperThreading on both cores, giving you four logical processors to play with.

squeezed onto a single slice of silicon, it's based on the same 90nm manufacturing process technology, boasts a carbon copy feature-set and uses Intel's existing LGA775 socket and CPU packaging. So, each core is a 31-stage pipeline Netburst design with 1MB of L2 on-die cache memory and comes complete with a familiar spec list that takes in multimedia-friendly SSE1, 2 and 3 instruction sets, XD-Bit and Intel's EMT64 64-bit memory addressing technology. And that's as fancy as Intel's first delivery for the dual-core platform gets.

As the world's largest chipmaker with a vast array of multi-core projects on the boil (15 at last count), you might expect some high-tech, low-latency on-chip inter-core communications technology. And you'd be wrong. Although both cores are integrated onto a single die, they share no on-chip circuitry or resources. Just like Intel's current single-core platforms, there's a single front-side bus running at 200MHz (quad pumped for an effective frequency of 800MHz) handled by a discreet Northbridge chip that delivers system memory and I/O communications to both cores. And just like a dual processor Xeon server or workstation platform, all inter-core communications, including those involving cache memory coherency, are handled off the CPU package by the Northbridge chip. Indeed the dual Xeon analogy is very apt: functionally, the Pentium Extreme Edition 840 D is very

similar to a dual CPU Xeon system. In isolation, that's an attractive proposition given the potential performance boost on offer in multi-threaded applications and in multi-tasking usage (see 'Performance analysis' above) and the eye-watering pricing of a typical dual-CPU Xeon system. But, as we shall see, AMD has some impressive technology up its sleeve.

Flexible platform

Unsurprisingly, Intel claims it's very comfortable with this approach. According to an official Intel spokesperson: "It allows Intel to bring multi-core benefits and value to our end customers quickly and in volume." Intel also points out that keeping the memory controller and I/O communications on a discreet chip enables it to "deliver the latest memory technology and enhance the other elements of the platform more rapidly."

As well as providing a platform for the dual-core Pentium family (the 915 and 925 chipsets are not compatible despite sporting the same LGA775 socket), the new 955X Express chipset also adds support for 8GB of dual channel DDR2 memory, running at 667MHz, an updated disk controller with SATA 2 and RAID in 0, 1, 5 and 10 configurations and dual PCI-Express x16 graphics ports.

But how does Intel's HyperThreading technology, designed to improve multi-threaded performance, fit into this new multi-

core CPU design era? Well, Intel would argue that if running two threads simultaneously on a dual-core CPU is great, running four on a HyperThreaded dual-core chip is even better. So, HyperThreading lives on. But only in this initial high-end Extreme Edition chip, for now. The full family of dual-core Pentium processors, due for release this summer, includes a trio of non-Extreme Edition chips, the Pentium D 820, 830 and 840 processors (note that the '4' has been officially dropped from the branding for these dual-core CPUs). Only the Extreme Edition boasts HyperThreading support. The other key

"ALTHOUGH BOTH CORES ARE INTEGRATED ONTO A SINGLE [INTEL] DIE, THEY SHARE NO ON-CHIP CIRCUITRY..."

differentiator on the Extreme Edition is an unlocked CPU multiplier. This is a first on an Intel chip, and is an indication that it has finally taken on board the demands of enthusiasts.

As for operating frequencies, the Extreme Edition 840 D and the plain vanilla 840 D both clock in at 3.2GHz, while the 830 and 820 run at 3.0GHz and 2.8GHz respectively. That's not hugely impressive for an architecture built for pure clockspeed. However, the implications in terms of heat dissipation and power consumption of cramming two 90nm Prescott cores on a single silicon die are challenging to say the



PERFORMANCE ANALYSIS 2.2GHz AMD Opteron 875

PRICE GUIDE £1,000 to £1,500

First, a formality or two. It's important to note the Opteron 875 is a server CPU, not a desktop chip like the Pentium Extreme Edition 840 D. Likewise, the review system provided by Armari is a workstation rig running a dual-socket Tyan Thunder K8WE motherboard. However, for our comparison tests, we ran the system in a single CPU configuration. Thanks to the Nvidia nForce 4 chipset used by the Tyan motherboard and the close relationship between this Opteron CPU and the upcoming Athlon 64 X2, we're confident our results are very close to the numbers a 2.2GHz 4400+ dual-core Athlon will knock out on a desktop nForce 4 platform.

Most of all, the manner in which the Opteron scales, compared to a single-core K8 processor is deeply impressive. In our Windows Media Encoder test, for instance, the 2.2GHz Opteron cut the encode test time by fully 45 per cent compared with a 2.4GHz Athlon 64 processor. Intel's 3.2GHz Pentium Extreme Edition 840 D, by contrast, only managed to shave 19 per cent off the time required by a 3.8GHz single-core P4. Of course, the Opteron's superiority is partly down to the smaller clockspeed differential. But not entirely. In fact, the Opteron appears to scale so well, it actually overhauls the Pentium in tests that traditionally favour the high-clocking Netburst architecture, such as those that are heavy on SSE operations.

One area where we thought it might fall behind was in our subjective multi-tasking tests. One test involved running an intensive video encode session in the background while playing Doom 3. At first, we thought the Pentium's extra pair



The technology behind the Opteron 875 is very similar to what we expect from AMD's upcoming Athlon 64 X2.

of logical cores, courtesy of HyperThreading, had delivered a decisive victory. It passed the test with flying colours while the Opteron creaked and groaned. But when we used Windows Task Manager to assign core affinity in each application, the Opteron was every bit as smooth as the Pentium. It's a separate issue from the thread-management problems that affects Intel's Hyperthreading technology, and one we doubt will be addressed until Microsoft Longhorn operating system appears.

It's early days yet, and no doubt more comparative nuances will be exposed as we spend more time in the company of these dual-core chips. But for now, things are looking very good indeed for AMD.

least. The highest clocking single-core Intel CPU, the Pentium 4 570 3.8GHz, has a Thermal Design Power (TDP) rating of 115 Watts. The new Extreme Edition beast trumps that with a frightening 130 Watt TDP.

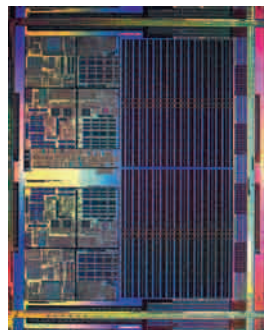
AMD's workstation, server and desktop processor product lines.

Our official AMD spokesperson advised us that, along with the one-, two-, four- and eight-way Opterons, AMD is limbering up to unsheath a full

range of desktop dual-cores, which will be marketed under the 'Athlon 64 X2' moniker, all based on the same architecture. While Opterons will initially top-out at 2.2GHz, the flagship Athlon 64 X2 4800+, which AMD claims will be shipping in volume by June, will hit 2.4GHz at launch. Impressively, that's just 200MHz below the highest

existing single-core chips, and at the same time achieve that relatively small 200MHz clockspeed delta. So, the Opteron 875 is rated at 95 Watts, while the 2.0GHz 870 is a 55 Watt chip and

SUPPLIER Armari 01923 225550
INFO www.armari.co.uk
Our test set-up (and many other configurations for the dual-core Opteron CPU) can be purchased from Armari. Apart from the twin dual-core Opteron 875s, our preview system boasts the nForce Pro 220 chipset, 1GB of DDR400 RAM and a 256MB GeForce 6800 GT graphics card.



The die plot for AMD's dual-core Opteron 800 series processor. The same technology will eventually trickle down to desktop components.

Pricing, meanwhile, for the entire range has yet to be announced. Although the Extreme Edition, which is available now, is yours for a cool \$999 (around £550), Intel will only say that the remainder of the line-up will hit mainstream price points. Sources close to the giant chip firm, however, indicate the Pentium Ds will range from around £150 to £300.

AMD's offering

If that's the low-down on the Pentium's dual-core debut, what's AMD's riposte? Well, the first point to note regarding AMD's initial dual-core CPU release, the Opteron 800 series, is that it's explicitly a chip built for server platforms. Hence, it's not a direct competitor with Intel's dual-core Pentiums. But although the dual-core Opteron 875, as configured in the workstation system supplied to PC Plus, is designed for eight-way server applications, it uses precisely the same technology that will appear throughout

range of desktop dual-cores, which will be marketed under the 'Athlon 64 X2' moniker, all based on the same architecture. While Opterons will initially top-out at 2.2GHz, the flagship Athlon 64 X2 4800+, which AMD claims will be shipping in volume by June, will hit 2.4GHz at launch. Impressively, that's just 200MHz below the highest clocking single-core Athlon 64 currently available, the FX-55. The remainder of the Athlon 64 X2 family is rated between 4200+ and 4600+ depending on clockspeed and cache size with the entry-level chip running at 2.2GHz and packing 512KB L2 cache per core.

This brings us neatly to the first obvious advantage AMD's dual-core architecture boasts over the Intel opposition: process technology. While the P4 hit a thermal wall at 90nm, AMD's single-core K8 processors in 90nm trim actually run cooler and use less power than their 130nm progenitors. This is a boon, when you're

trying to squeeze two power-hungry CPUs cores into the space previously occupied by one. It has allowed AMD, for instance, to specify its entire range of 90nm dual-core processors within the same thermal envelopes as its

integrated memory controller and HyperTransport I/O interface. It's these technologies that allow AMD to claim the K8 has had multi-core at its heart from the very beginning and it delivers two key benefits. In simple terms, AMD has carried over the integrated memory controller and HyperTransport I/O from the K8 intact for its dual core processors. There's no support for new-fangled DDR2 memory, its tried-and-tested dual channel DDR memory at up to 400MHz. Also present again is the crossbar switch. Think of it as a high-speed, general-purpose data clearing

Benchmarks...

Processor	3.2GHz Intel Pentium EE 840 D	3.2GHz Intel Pentium EE 840 D (HyperThreading disabled)	3.8GHz Intel Pentium 4 570	2.2GHz AMD Opteron 875	2.4GHz AMD Athlon 64 4000+
Single task					
Doom 3 800x600	89fps	89fps	94fps	107fps	109fps
Paintshop Pro 9 script (time in secs)	14	14	11	12	11
Photoshop 7 script (time in secs)	42	47	67	44	80
Windows Media Encoder (time in mins:secs)	2:55	2:49	3:37	2:29	4:31
iTunes WAV to MP3 (time in mins:secs)	1:41	1:41	1:52	1:33	N/A
DVD2AVI MPEG2 to MPEG4 (in mins:secs)	1:16	1:16	1:08	1:14	1:09
Multi task					
Doom 3 + video encode	64fps	57fps	44fps	74fps	68fps
Video encode + anti-virus scan (mins:secs)	3:30	3:15	4:07	2:51	4:47
Doom 3 + virus scan	74fps	82fps	75fps	96fps	91fps
Synthetic					
Sisoft Sandra memory bandwidth MB/s	4,266	N/A	4,671	5,457	N/A
Scencemark 2.0 memory bandwidth MB/s	4,502	N/A	4,324	5,186	N/A
Cinebench 2003 single CPU (time in secs)	92.8	92.8	78.9	83.6	78
Cinebench 2003 multi CPU (time in secs)	42.8	49.7	65.5	44.8	N/A
3DMark 2005 CPU test 1	3.8fps	2.9fps	2.6fps	2.7fps	2.2fps
3DMark 2005 CPU test 2	5.2fps	4.7fps	4.4fps	5.5fps	3.7fps

house, which the memory controller communicates with the HyperTransport interface through, and likewise enables the execution cores to share data with both the HyperTransport links and memory controller. On the new dual-core die, it sits between the two execution units, each with a discreet cache memory pool (up to 1MB L2 per core depending on spec), and the memory controller and HyperTransport bus. Crucially, unlike the Pentium Extreme Edition 840 D, inter-core communications take place on-die and at the internal chip frequency. That means more bandwidth and less latency. And that's definitely a good thing, as the results from our performance tests amply demonstrate. Making generalisations from a set of benchmark figures is a treacherous endeavour, but it's simply impossible to ignore the fact that, compared with the single-core equivalents, AMD's dual-core CPU scales better than the Pentium 840 D in all but one multi-threaded test we ran (see the above comparison table). As AMD's European Product Manager, Dave Everitt, told PC Plus, "We reckon we've got our plumbing right." Indeed.

The other benefit of this carry-over approach is that it enables the new dual-core Athlons and Opterons to drop straight into to existing 939 and 940 socket motherboards, the only requirement being a BIOS update. Particularly for workstation and server systems already running Opteron CPUs,

these new dual-core chips must surely represent a killer upgrade. Of course, the initial eight-way server chips won't come cheap: the Opteron 875 is priced at over \$2,500 (around £1,300). However, as with Intel, AMD plans to encourage quick adoption of its dual-core desktop CPUs with mainstream pricing, though the firm declined to provide these as we went to press.

Conclusions

So it's first blood, both on paper and in the benchmarks, to AMD's dual-core processors, then? Yes, but that's not the end of this story. There's a long way to go before the desktop software environment catches up with multi-core hardware. Despite the fact that Intel's HyperThreading technology, which has been around for several years, has provided incentive for application developers to code multi-threaded applications, most consumer level software centralises the CPU-intensive number crunching into a single thread. And make no mistake, these dual-core CPUs are not as fast as their higher-clocking single-core siblings for such single-threaded software. Indeed, both AMD and Intel have been very clear that these first dual-core processors will not be the performance leaders on the desktop in many existing applications, and particularly for gaming. Which begs the question, when will multi-threaded software become the norm? Intel's C++ compiler, for instance, already includes

auto-parallelisation. This is a technique where the compiler scans code and attempts to detect sections that can be separated out into discreet threads. In a perfect world, auto-parallelisation would work with even the sloppiest code and thread it neatly. In practice, however, it's only helpful where tasks are exactly partitioned. Unfortunately, that's rarely the case in current production environments. We would suggest looking toward 2006 as the year that developers get their collective noggins around multi-threaded code.

The game is far from over for Intel. The company has huge resources, both financially and in terms of research and design capabilities. Smithfield may be as basic as single-core architectures can get, but it's only the first dual-core CPU from Intel. Later this year we're likely to see Yonah, the dual-core revision of its crushingly successful Pentium-M mobile processor. It's a very advanced design complete with 2MB of shared cache memory, HyperThreading and support for Intel's operating system virtualisation technology. Meanwhile, back on the desktop, Intel has a raft of new dual-core chips lining up. Early next year, Dempsey and Paxville, both dual-core Xeon CPUs backed by powerful new chipset platforms, will appear. And before summer 2006 arrives they'll be followed by Presler, the first 65nm dual core desktop CPU. Strap yourself in tightly, we're set for an exciting ride over the next 12 months.

Jeremy Laird

Following the thread

1961

Burroughs introduces the B5000 series, the first computers to make use of more than one processor

1989

Intel launches the 486 DX processor, with a built-in math co-processor. This is effectively the first CPU with two cores

1989

Pat Gelsinger releases a White Paper on mainstream dual-core computing

1995

Intel launches the Pentium Pro, the first CPU that's specifically designed for use in multi-processor environments

2002

Intel introduces its HyperThreading technology, which enables multi-threaded software applications to execute threads in parallel on a single processor

2004

AMD demonstrates the first working examples of dual-core silicon

2005

Intel pips AMD to the launch of the first dual-core processor. AMD releases its first server examples in the same month

2006

AMD is due to release its first dual-core desktop chips, the Athlon 64 X2 series

2006

Intel is due to release dual-core versions of its Pentium M range, under the codename Yonah

2015

Intel plans to release chips with 100 cores or more...

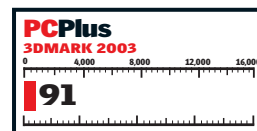
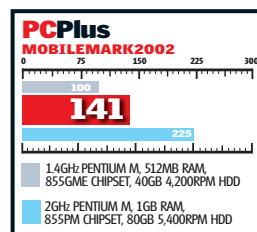
HP dv1139ea

A black HP Pavilion dv6000 laptop is shown open, displaying the Windows XP desktop with the 'Rolling Green Hills' wallpaper. A red badge in the top left corner of the image reads 'BATTERY LIFE 2hr43'. The laptop features a black keyboard, a touchpad, and a silver HP logo on the bezel. The bottom of the laptop shows various ports and a small HP logo.

Russell James

PRICE £880 (£749 ex VAT)
DELIVERY Free
SUPPLIER Comet 0870 542 5425
INFO www.hp.com/uk
WARRANTY One year, return to base

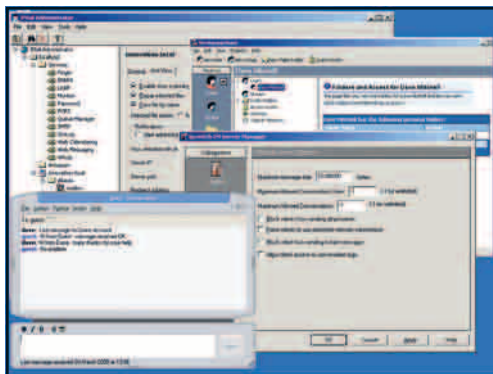
CPU 1.6GHz Intel Pentium M 725
RAM 512MB DDR333
CORE LOGIC Intel 855GME
HDD 60GB Hitachi (4,200rpm)
DRIVES Samsung 8x DVD±RW
GRAPHICS Integrated Intel Extreme 2
 (64MB shared)
SCREEN 14in WXGA (1,280x768)
SOUND Integrated Intel AC'97
SPEAKERS Stereo
COMMS 802.11b/g Wi-Fi, 10/100
 Ethernet, 56k modem
PORTS 3x USB 2.0, 4-pin FireWire, Type
 II PCMCIA, 5-in-1 Card Reader, VGA-Out,
 S-Video, HP expansion port,
 Headphones, Mic, S/PDIF
OTHER HARDWARE Remote Control
OS Microsoft Windows XP Home
OTHER SOFTWARE Microsoft Works
 Suite 2005, Adobe Reader 6, InterVideo
 WinDVD, InterVideo WinDVD Creator,
 Sonic RecordNow, HP Image Zone,
 Apple iTunes
DIMENSIONS 334x235x30mm
WEIGHT 2.42kg



Category	Value
Value	8
Features	7
Performance	7
OVERALL	7

USER-FRIENDLY WORKGROUP ORGANISATION

Ipswitch Collaboration Suite



Integration could be better handled, but ICS does offer strong email features.

However, some work at each client is required. You'll need to point the mail client at the new mail server, and install a separate utility on each one to allow them to share

Outlook data. It's important to note that the WorkgroupShare component doesn't support Outlook Express.

For antivirus measures you get BitDefender with the Standard version, whilst the Premium and ISP versions get the benefit of Symantec's undisputed expertise.

These components slot in neatly and are accessed from the IMail administrative interface. This is where you can clean or delete infected attachments, bounce warning messages to the sender and send email alerts. The core IMail Server component needs no introduction, and

we were seriously impressed with its range of features when we looked at v8.1 (PC Plus 220).

The Outlook add-on required for WorkGroupShare can be deployed from a shared network folder. It adds a new 'Share' option to the Tools menu, allowing users to upload their shared contacts, calendars and tasks to the ICS server where administrators can then decide who is allowed to access them. It's easy to use, but note that IMail Server's Web Calendar feature also provides shared appointment diaries and task schedulers as standard.

The IM Server is easy enough to manage, and workstations will need an IM client installed locally as well. With this in place, users can load up the IM interface and get busy chatting to users they are authorised to contact.

With IMail Server at its heart, ICS delivers excellent email facilities and backs them up with useful groupware tools and decent antivirus protection. Some work needs to be done at each client, and we would have preferred to see the entire suite managed from a single interface, but otherwise ICS is good value and fairly easy to use.

Dave Mitchell

INFORMATION

PRICE Standard £885 (£753 ex VAT)
SUPPLIER Unipalm 01638 56 9607
INFO www.ipswitch.com

REQUIREMENTS

CPU 500MHz or faster
RAM 256MB minimum
OS Windows 2000 Server, Server 2003

IN A NUTSHELL

Ipswitch takes its well respected small business mail server, and adds extras to turn it into a groupware solution. Component integration isn't so extensive, but it's still easier to use than Exchange and it costs a lot less as well.

PC Plus ratings

IPSWITCH COLLABORATION SUITE

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●

OVERALL

7

IMail Server has always been the strongest product in Ipswitch's software line-up and its latest Collaboration Suite (ICS) teams it up with calendar, task list and contact sharing for Outlook users, as well as secure instant messaging (IM) and stiff anti-virus measures. Anti-spam is also on the menu, but this is a fundamental part of IMail Server anyway.

Installation is reasonably streamlined. Although each component is installed separately, the entire process is overseen by a single utility that allows you choose which components you want to load.

INFORMATION

PRICE £799 (£680 ex VAT)
DELIVERY £46 (£39 ex VAT)
SUPPLIER Mesh 0870 046 4747
INFO www.meshcomputers.com
WARRANTY One year on-site, second and third years, return to base

SPECIFICATION

CPU 2.2GHz AMD Athlon64 3500+
RAM 512MB PC3200 DDR
CORE LOGIC Asus A8N-SLI Deluxe
HDD 200GB SATA
DRIVES Sony DVD-RW DW-D22A, 16x DL, Sony DDU1612 DVD-ROM 16x/40x
GRAPHICS 128MB Nvidia 6600GT PCI-E, TV-out and DVI
SCREEN 17in ViewSonic VE710b TFT
SOUND Onboard 5.1 Surround Sound 6 Channel Audio
SPEAKERS Creative Inspire P5800 5.1
COMMS 56k Modem, 2x Gigabit Ethernet
PORTS 8x USB 2.0, 6-pin FireWire, Parallel, S/PDIF out
OTHER HARDWARE Logitech Keyboard and Mouse
OS Microsoft Windows XP Home
OTHER SOFTWARE Microsoft Works 8, CyberLink Power2Go, Power2Go, PowerProducer 3, PowerDirector 3, PowerDVD Copy, PowerCinema 4

SUB-£800 ATHLON 64 PC

MESH Matrix Prestige Xtra

Just how do system builders dream up names for their systems? The Matrix Prestige Xtra? That's certainly one for the next PC Plus anthology of mad-as-cheese system names. Still, such literature is a bonus when you consider what else you'll get for £800, give or take the extra £40 needed to actually get the box delivered. But you shouldn't begrudge the extra cash, because aside from being a cracking system for this price bracket, what's really surprising is that MESH continues to deliver top components even when price is clearly the driving force behind this system. When you're talking about a budget system, and there's an Asus A8N-SLI Deluxe motherboard gathering all the bits and pieces together, you know you're being treated well.

The price you pay

Of course, this MESH system isn't the first we've seen employing AMD's 90nm Winchester core at its heart. This variant is the 3500+. Naturally, we would prefer to see an Athlon 64 4000+, though it doesn't mean the world in terms of performance increase. It's an obvious statement, but it's this kind of component-swapping that enables the £800 price point. Likewise with the system's memory: it's always a balance. In an ideal world, you would be looking for 1GB of RAM, but for those cutting-edge morsels, you're probably looking at £200 more. A

200GB hard drive is welcome, as are two Sony DVD drives. As an aside, it's good to see that dual-layer drives have come into the range of a great many system builders when it's still relatively new technology.

One of the most impressive things about many budget systems is that they're now being shipped with

thoroughly decent graphics cards. This is an area that was previously rather neglected, so the inclusion of a 6600GT is an unexpected pleasure. The 3Dmark 2005 score of 3,723 is indicative of the long lifespan this card has ahead of it. 8,523 in 3Dmark 2003 is also thoroughly predictable. Indeed, a 6600GT is an excellent mid-range card. Half-Life 2 may have lined the pockets of ATI and Nvidia quite liberally, but there's going to be nothing released any time soon



The Matrix Prestige Xtra is seriously good value for money, with a massive eight USB ports on offer and a 5.1 set of P5800 Creative speakers also included in the package.

that will force your GT into redundancy. It will stand you in good stead for the next couple of earth orbits.

Of course, should you wish to, you can upgrade to SLI with the Asus board, though you'll probably feel it an unnecessary and expensive luxury. Were you to upgrade, you would also probably have to scrap the existing 600GT, since one of the more annoying quirks of the technology is that you'll need to have a pair of cards that are identically matched.

In PC Plus 227, we noted that a MESH Fireblade system wasn't too noisy. However, we feel that the Prestige Xtra won't gain any decibel awards from the Environmental Health. Its continual whine is noticeable if you have it on a tabletop.

Aesthetics

MESH would benefit from sprucing up its PCs. Other system builders, such as Evesham, steal a march on MESH in terms of looks and box aesthetics. The power button and floppy drive are fabricated from terribly cheap-feeling plastic. At the moment, the Prestige Xtra reminds us a little too much of an IBM ThinkCentre for comfort. While we're on the subject of the case, we could do with a few more frontal ports. We appreciate the two USBs, but a front-mounted headphone jack is an absolute essential these days. Mesh does exceed expectations by giving two more USB ports on a PCI card, too. That's a stonking eight USB ports in all.

In terms of add-ons, MESH also comes up trumps. You wouldn't really

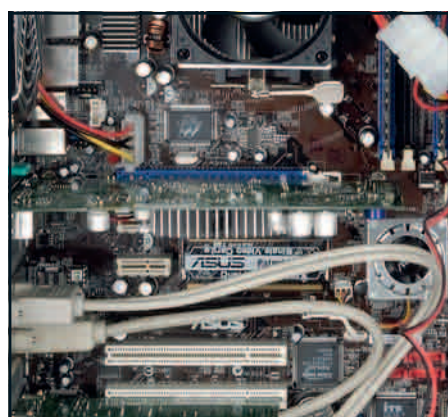


Unfortunately, the looks don't match up to the quality of the rest of the system.

expect much in terms of a decent screen at this price, but the 17in ViewSonic VE710b TFT is a top inclusion in terms of quality. MESH even scores some points with the keyboard and mouse. Too often, we're forced to use cheap peripherals simply because system builders think they can get away with it. After all, nobody buys a PC because it has a nice keyboard. Logitech has partnered with MESH to provide the set included with the Matrix Xtra and, although it's plastered with MESH logos, the set is absolutely fine for general use. But, and we feel like salespeople here, it doesn't stop there: a 5.1 set of P5800 Creative speakers has also been thrown in.

So the Matrix Xtra really is excellent value and, as we all know, most PC buyers generally buy according to price. It exceeds our expectations at this level. However, whether you would be sold on this system depends on whether you're prepared to spend £800 to get a lot, or £1,000 plus to get a little more.

Dan Grabham



The inclusion of a 6600GT graphics card is another surprising bonus.

PC Plus ratings

MESH MATRIX PRESTIGE XTRA

Value	●●●●●●●●
Features	●●●●●●●●
Performance	●●●●●●●●
OVERALL	8

INFORMATION

PRICE 100 user pack £1,833 (£1,560 ex VAT)
SUPPLIER NetIQ 01784 45 4500
INFO www.netiq.com

REQUIREMENTS

CPU 450MHz or faster
RAM 384MB minimum
OS Windows 2000, XP or 2003

IN A NUTSHELL

This comprehensive suite helps administrators take control of their Active Directory environments and provides the tools to effectively manage users, accounts and group policies. The suite presents a steep learning curve, but most components can be accessed from a single console. Good security features mean that many of the more mundane daily tasks can be delegated, yet still strictly controlled.

BUSINESS-LEVEL NETWORK SECURITY SOFTWARE

NetIQ Security Suite 5

While most companies have managed the move to Active Directory (AD) successfully, their problems don't end there, because general day-to-day administration still requires a fair amount of human input. NetIQ's Security Administration Suite (SAS) aims to ease the support burden by providing a complete solution, comprising three products: its Directory and Resource Administrator (DRA), Exchange Administrator (ExA) and File Security Administrator (FSA).

DRA looks after automation of AD group policy creation and deployment and improving user account management, while ExA handles mailbox management and supports Exchange 5.5, 2000 and 2003. FSA brings up the rear and delivers the tools to manage network resources such as files, folders and shares, plus disk quotas. The keyword with SAS is delegation, because one aim of the suite is to enable administrators to safely distribute many tasks to designated staff. Top-level administrators retain overall control, though, by using SAS security models that determine which users have these privileges, what they're allowed to do and what objects they can manage.

Users handed these tasks are classed as Assistant Administrators (AAs) and security models that control them can be static or dynamic. The former defines specific objects and permissions assigned to an individual AA. You could, for example, give them the power to change the general

details, address and telephone number properties of a particular group of users. However, adding further powers or removing privileges must be dealt with manually. Dynamic security models, on the other hand, use rules that can be applied to multiple AAs, group membership or wildcards enabling them to adapt to

any changes that may occur within the organisation. Roles define different sets of permissions for completing certain administrative tasks, while ActiveViews define the user, group and resource objects. Essentially, AAs define who has administrative powers delegated to them, roles determine what they can do, and ActiveViews define what they can do it to.

Installation initially looks a daunting task thanks to the small rainforest of manuals provided by NetIQ. However, we were pleasantly surprised at how



Despite the range of features included in NetIQ Security Administration Suite 5, the majority of tools can be accessed from a single management console.

well it was handled. We loaded SAS on a Windows Server 2003 domain controller running Exchange 2003 and found that, despite the number of products involved, the entire process was handled smoothly by a single utility. Even more impressive is that, although six new tools are loaded, they can all be accessed from a single console. DRA comprises three utilities designed to manage AD accounts and resources, delegate administrative tasks, manage policies and automated tasks and provide access to reporting tools. The first offers fast access to AD objects such as users, groups, computers and OUs, enabling you to search by keyword, look for them in all managed objects, domains or those contained within ActiveViews, and choose their name, location, and description for matching purposes. Selecting a user provides access to their details, where you can lock and unlock the account, reset the password, change logon details and see which ActiveViews they may be assigned to.

Delegate and control

The Delegation and Control tool is where you get to play with AAs, roles and ActiveViews, and the process of creating new ones is helped along by plenty of wizards. This is also where policies and automation triggers come in. Policies contain rules that can be used to enforce administration procedures, and come into play whenever certain operations occur. If an AA decides to create a new user or maybe an Exchange mailbox, you can use policies to force them to use a



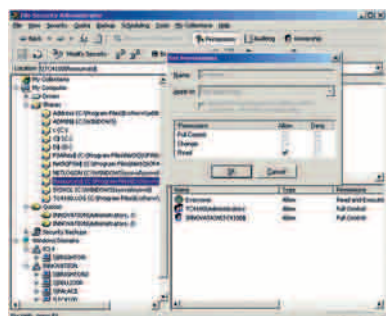
You have easy access to many of the more common AD administrative tasks.

strict naming convention, automate home directory creation and maybe implement a disk quota as well.

The reporting module provides a wealth of information about all AD-related activity, but it's annoying that once you've finished viewing a report on-screen, you can't go back to the generator module. You have to close the whole report and restart the module. FSA is the easiest component to use, as it provides a simple interface for viewing files, folders and shares across the network and requires an agent installed on each system. On first contact with each system, the console will automatically deploy the agent to it. Now you can remotely view drives, all files and folders plus network shares, set access permissions and define disk quotas, as well.

SAS is clearly a powerful tool for an AD environment. It's far too heavy for smaller businesses confined to a single location, but administrators of distributed networks and multiple AD domains could find it invaluable.

Dave Mitchell



FSA enables you to browse remote computers and set quotas and access permissions.

PCPlus ratings

NETIQ SECURITY ADMINISTRATION SUITE 5

Value	●●●●●●●●●●
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
OVERALL	8

INFORMATION

PRICE £329 (£280 ex VAT)
SUPPLIER Propellerheads
 01923 20 4010
INFO www.propellerheads.se

REQUIREMENTS

CPU 330MHz or faster
RAM 256MB minimum
OS Windows 2000 or later

IN A NUTSHELL

Still the king of the softsynths, this is a package to be reckoned with. Rarely have we seen a more fully-featured audio program, but don't expect miracles – talent is still required.

SOFTWARE STUDIO IN A BOX

Propellerheads Reason 3

Reason has carved out not just a niche but a huge furrow for itself as the 'software studio in a box' that others aspire to. It offers a sizeable collection of synthesizers, drum machines and samplers that can be mixed and processed with an equally impressive selection of audio gizmos and other devices: compressors, chorus units, filters, vocoders, delay and echo units, and generally everything you can find stacked up in tidy racks in a professional studio. Virtuality brings much lower costs and doesn't demand the physical space need for a real rack. Instead, Reason gives you one big virtual rack that you can fill as much as you like, or until your processor runs out of horsepower. And with the newest processors, this means a very big rack indeed.

Connecting cables

Around the back of this on-screen rack (you get there with a quick hit of the [Tab] key), you can connect anything to almost anything else with virtual cables. One of Reason's strengths is its incredible versatility here. It's capable of creative patching techniques and options that aren't available on real hardware. Rounding off the package is a sequencer/arrange page that can include automation information as well as notes, and a step and pattern sequencer module that can be plugged in for burly synthesizer loops and chunky basslines. Users of Cubase and other sequencers can also control Reason remotely using the Rewire protocol. This sends MIDI and control information in one direction and accepts audio in the other, so Reason slots into a pair of Cubase mixer channels. You can also set up feeds for processing and mixing individual instruments and sub-mixes separately.

Propellerheads hasn't changed any of these

basics in this release, but some new features have appeared. There are no new synthesizers, but a patch grouper called Combinator lets you pile together as many synthesizers as you want into a single monster instrument, with extended features like modulation routing and key range splits. It's more of an evolutionary than a revolutionary addition, but it makes certain kinds of patch creation easier. There are also some new audio processors designed for audio mastering work – a compressor, an EQ, a stereo width



This patch is a single Combinator instrument made up of several synthesizers. It's big, fat and has clever modulation routings.

processor, and a level maximiser. These all do what you would expect, with decent sound quality. One surprise is that there's no multiband compressor, which usually seems to be obligatory in collections like this one.

The other major change is improved support for hardware controllers. It's now much easier to plug in an external controller like those from Novation or M-Audio, and get instant access to Reason's controllers and other features. More minor changes include a useful new sub-mixer module, a revised and expanded file browser, and an updated patch bank with all the old favourite sounds and some impressive new ones. The file browser is a bit of an oddity and takes a while to get used to, partly because of Reason's rather quirky need to keep patches for different synthesizers in their own separate folders.

Single rack issues

What about criticisms? The Propellerheads site lists some bugs that crept into this release. Some are mildly annoying or eccentric but none are lethal, and reliability in general seems very good for an x.0 product. As already mentioned, the lack of a multiband compressor in the mastering section is a bit of a surprise. Perhaps it's being saved for 3.5?

More fundamental are some issues with the Reason concept itself. The single-rack approach is becoming more and more of a liability as patches become more complicated. It means that anyone with a fair-sized monitor – 1,600x1,200 or bigger is hardly



The new mastering processing set-up comes with a fake gold panel finish. Fortunately, it's useful as well as flash.

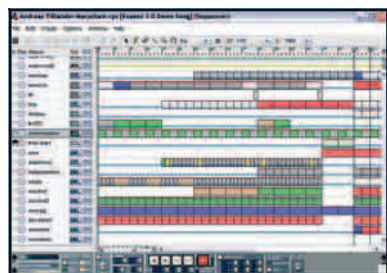
esoteric now – wastes half their screen real estate. The sequencer suffers from similar drawbacks. It more or less does the job, but no one could call it elegant, and some polishing here would make user's lives easier.

And sound quality remains an issue. Some of the instruments have the potential to sound fantastic, but Reason seems to lack any dither on its outputs, so the sound that comes out of the final mixing stage is noticeably rough and grainy.

This may only bother professionals with golden ears, but it's still a shame because it's an easy thing to fix. For now, if you want the best sound from Reason, you'll need to Rewire it through something like Cubase or Nuendo as an output stage.

Overall, though, these are the kinds of issues that will only bother experts and professionals. For Reason's core home studio market, it's a fantastic product exploding with creative potential and capable of results that can more than hold their own against much pricier musical toys at almost any level. It's also a lot of fun. For the price, you really can't go wrong.

Richard Wentz



The sequencer hasn't changed much from earlier versions. It's still not pretty and not clever.

PC Plus ratings

MYOB ACCOUNTING PLUS

Value ●●●●●●●●●●
Features ●●●●●●●●●●
Performance ●●●●●●●●●●
OVERALL 9

EXTENSIVE BURNING SUITE

Roxio Easy Media Creator 7.5

There was a time when CD burning software involved a simple process of locating files on your system before dragging them onto an image that would burn itself to the end media.

But now, there's a definite battle emerging between developers, simply because there are so many alternatives on the market. To tempt you towards their own brands, all the various manufacturers are beefing out the potential that their software provides.

In addition to the fundamental CD/DVD burning options available in Creator, the software includes a range of options, available through a convenient central interface. This provides access to the various audio, data, photo, video and DVD options, as well as the more practical application-based tools and features. All this goes some way towards explaining why this seemingly simple application now requires the better part of 600MB for a standard installation.

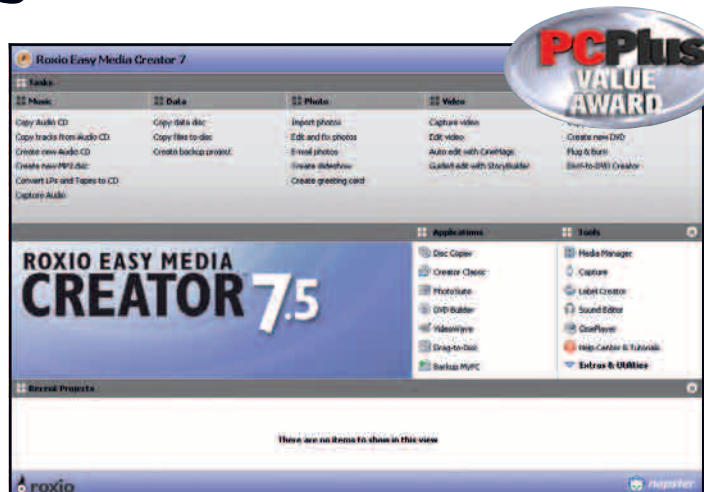
More for your money

Existing users will see a justification for such a large HDD footprint, as they will already appreciate Creator's powerful options, which extend far beyond basic data copying tools. Audio options go from CD copying through to MP3 creation and audio capture, while video benefits also include capture and extensive editing options using VideoWave, CineMagic and StoryBuilder.

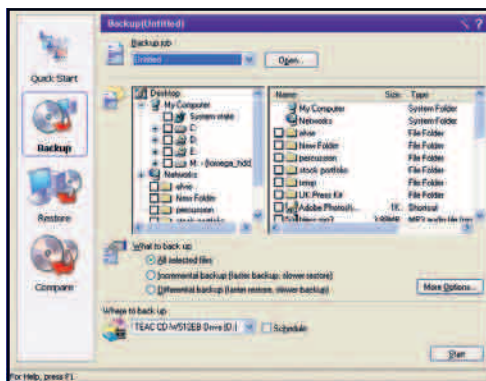
Photographers have access to the capable PhotoSuite title. This also integrates into the Creator bundle, to provide import, editing and optimisation options. You also get consumer-friendly methods of creating slideshows and galleries by which to distribute snapshots to friends and family. The more ambitious user can make use of DVD Builder not only to back up data, but also to create fully functional DVD menus to contain media files for viewing through a regular domestic DVD player.

Soon after you install the software, you realise that Creator is actually a suite of over 20 independent Roxio applications. And, with an initial price tag of less than £70, you're looking at an individual cost of about £3.50 per application, which makes this a ridiculous bargain even if you only use half the applications on a regular basis.

Thanks to the Roxio takeover of Sonic at the beginning of the year, the 7.5 upgrade includes a number of additional tools, features and applications that further extend the



The central interface of Creator 7.5 remains largely unchanged from the previous version, except that it now includes the numerous new tools and applications.



Backup MyPC is one of the Roxio titles now included to provide some powerful back-up and recovery options.

potential of the overall suite. Sonic's Backup MyPC 6 is included to provide a comprehensive method of imaging your entire system effectively, for more reliable system back-ups and disaster recovery. CinePlayer 2 and MyDVD Slideshow 6 provide complementary video and DVD playback and editing.

Audio options benefit from EasyAudio Capture, which grabs online audio streams. This is a curious addition considering the inclusion of Napster, a new LP and Tape Assistant for converting analogue audio that's fed through your soundcard's auxiliary or line-in, and dramatic improvements to sound-editing capabilities that provide fading and panning adjustments at any point in a track using envelope control. Audio is undoubtedly the most improved section of the suite. Creator can now almost stand up against dedicated audio editors.

DivX-to-DVD Creator is another new utility that covers the conversion of the increasingly popular DivX compression method, including Xvid, to the more familiar DVD-Video format,

which can be played back through a regular DVD player. DVDInfo Pro will be appreciated by those wanting a little more than just basic access to background information relating to their video data.

Despite such advances, Roxio hasn't ignored the fundamental burning elements of the

Creator suite. Disc Image Loader is a new component that enables users to mount disc image files in a virtual drive, with the ability to emulate up to 23 drives simultaneously so you can preview or store DVD-Video images before burning. And, with Roxio's established burning history, more advanced users can make use of diagnostic tools to test CD/DVD speed, 'read error' checks and DVD PI/PIF/Jitter tests to ensure error-free burning.

With so many new additions to the core functionality of the software, as well as the emergence of complementary Sonic titles, you would be forgiven for thinking that Roxio may well have considered giving the release a full generational upgrade.

More professional users will find that many of the tools won't rival more dedicated applications, but this is fundamentally a disc burning application. Such features are just a bonus that will be greatly appreciated by the novice home user. It would be a bargain at twice the price, especially considering the audio options.

Chris Schmidt

INFORMATION

PRICE £70 (£60 ex VAT)

SUPPLIER Roxio 01908 27 8100

INFO www.roxio.co.uk

REQUIREMENTS

CPU 1.6GHz or faster

RAM 256MB minimum

OS Windows XP (SP1),

Windows 2000 (SP4)

IN A NUTSHELL

Creator 7.5 is a CD and DVD burning application that extends its core data back-up functionality with support for various audio, photo, video and DVD editing options.

The new version now includes titles from the newly acquired Sonic developers to increase the multimedia potential in the growing suite of tools and features.



Advanced multimedia authors will appreciate the inclusion of some practical utility titles.

PCPlus ratings

ROXIO EASY MEDIA CREATOR 7.5

Value ●●●●●●●●●●

Features ●●●●●●●●●●

Performance ●●●●●●●●●●

OVERALL ●●●●●●●●●●

NFORCE4 BAREBONES

Shuttle XPC SN25P



With a slightly larger footprint than other systems in the Shuttle range, the SN25P offers a wealth of features for the PC enthusiast.

The emergence of small form factor chassis is one of the reasons that we're beginning to see more and more PCs in living spaces. Although they do look good, in many cases they aren't as powerful or feature-rich as full-size desktops. That may be true of many, but not of the new XPC SN25P from Shuttle. It's the first small form factor bare bones to have the nForce4 chipset, incorporating PCI Express, gigabit LAN and 1GHz HyperTransport system bus.

How has Shuttle done this? Well, not surprisingly it hasn't used the usual chassis, but a larger one which the company refers to as the P chassis. This is larger, higher and wider than the standard case and it needs to be.

One of the major concerns with other chassis in Shuttle's range was the amount of heat the various components generated. Heat inside a PC is always a concern and Shuttle has addressed this with the SN25P. Whereas the chassis usually only has one fan,

which cools the heatpipes that run off the heatsink, now there are five fans. Three of these now the heatpipes, one draws air away from the area around the heatsink and the other draws air out of the side of the case. Does this mean that it's now incredibly noisy? No. In fact it isn't much louder than the other Shuttles. If you're feeling brave, you can also play around with the



Style and content are both present in the compact Shuttle XPC SN25P.

smart fan settings in the BIOS and turn the fans down, so that they're even quieter.

Cunningly reinvented

In addition to the extra fans, by using a larger case you get more options when it comes to internal storage. One of the drawbacks of small form factor PCs is that you can only usually fit one hard drive due to the space constraints. With the SN25P that's not the case. If you opt not to install a floppy drive, you can have up to three SATA drives. Where do these go, we hear you ask? Well, you can mount one under the optical drive, and the other two can go above the optical drive, side to side. As with all the Shuttles, the power and data cables for these drives are neatly routed along the sides' supports, so that they don't get in the way of the sides or disrupt airflow.

The other feature is, of course, PCI Express. Two slots are present, one 16x for your graphics card and one 1x for any other device. At the moment there are few options available for you and you may find that this arrangement is rather limiting. By only having PCI Express you will struggle to install other devices.

Peripherals such as network cards make best use of PCI Express, but you don't even need one of these as it has a gigabit Ethernet adaptor built in.

This is perhaps the only downside of what is a rather clever bit of kit. That and the fact that the Athlon 64 doesn't support DDR2 at the moment. All in all, the SN25P offers an excellent level of features in a stylish and compact frame.

Henry Tucker

INFORMATION

PRICE £300 (£255 ex VAT)

SUPPLIER www.microdirect.co.uk
0870 444 4456

INFO <http://global.shuttle.com/>

WARRANTY One year

SPECIFICATION

CPU AMD Athlon 64 939-socket

RAM Dual-channel DDR support
400/533 up to 2GB

CORE LOGIC nForce4

HDD 3.5in bay (SATA, RAID)

SLOTS PCI Express 16x, 1x

PORTS Gigabit Ethernet, 6x USB 2.0,
2x IEEE1394



Five fans mean that there's no danger of overheating. Noise isn't a particular problem either.

PCPlus ratings

SHUTTLE XPC SN25P

Value ●●●●●●●●●●

Features ●●●●●●●●●●

Performance ●●●●●●●●●●

OVERALL

8

INFORMATION

PRICE £188 (£160 ex VAT)
SUPPLIER Actipro Software LLC
INFO www.actiprosoftware.com

REQUIREMENTS

CPU 100MHz or faster
RAM 16MB minimum
OS Windows 98 or later, .NET Framework 1, 1.1 or 2

IN A NUTSHELL

Actipro's SyntaxEditor control is a powerful and flexible code editor control, which features syntax highlighting support for multiple languages, code outlining and a great deal more. It's intended to emulate much of the functionality in the VS.NET code editor.

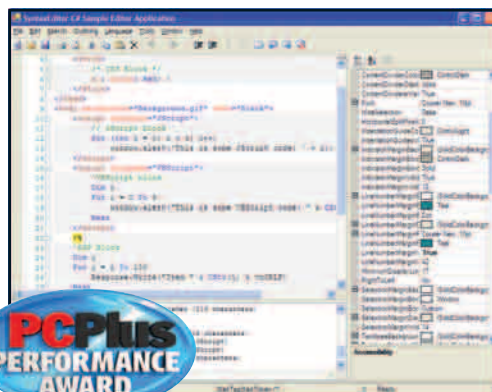
PCPlus ratings

ACTIPRO SYNTAXEDITOR .NET CONTROL 2.5

Value ●●●●●●●●●●
Features ●●●●●●●●●●
Performance ●●●●●●●●●●
OVERALL 9

TEXT EDITING .NET CONTROL

SyntaxEditor .NET Control 2.5



The SyntaxEditor can handle a variety of programming languages at one time.

simply for displaying log files or status messages, but in our opinion, this would be like using a sledgehammer to crack a walnut.

SyntaxEditor includes language definitions for C#,

VB.NET, VBScript, JScript, HTML, XML and more. C++ is a surprising omission. If you need to support another language, such as Object Pascal, the product includes a built-in Language Designer for creating a custom language definition. What's especially great is the way in which SyntaxEditor can perform syntax highlighting for multiple languages, all within one source file. The accompanying screenshot shows a HTML file displaying embedded VBScript and JScript fragments.

If a code editor is what you're looking for, Actipro SyntaxEditor will almost certainly fit the bill. Actipro suggests that you could switch the editor into read-only mode and use it

Other high-end features include the ability to work with proportional fonts,

and built-in support for outlining and folding, like the region facility in VS.NET. There's also unlimited undo/redo and a nice facility for highlighting matching pairs of brackets and parentheses.

Lines that have been modified are automatically identified by a coloured strip that appears in the gutter area, and naturally you can also display line numbers, bookmarks and other gutter adornments. And yes, to answer the question you've been itching to ask, SyntaxEditor also has a cute IntelliPrompt system, which provides code completion and information tips, just like Microsoft's IntelliSense.

On the negative side, the huge number of properties surfaced by the SyntaxEditor control cry out for a more hierarchical nested property scheme. For example, there are eight top-level properties associated with line number margins. By nesting these another level down, it would be more manageable.

Minor gripes aside, this is an awesome editor control that comes with sample projects and superb class reference documentation. It's not the cheapest of code editor controls, but then you get what you pay for.

Dave Jewell

INFORMATION

PRICE £250 (£213 ex VAT)
SUPPLIER REAL Software Inc.
 (512) 328 7325 (USA)
INFO www.realsoftware.com

REQUIREMENTS

CPU 100MHz or faster
RAM 16MB minimum
OS Windows 98, NT (4 or later), 2000, XP

IN A NUTSHELL

REALbasic 5.5.5 is a high-quality cross-platform development tool for Windows, Apple Mac and Linux. One of the benefits of the Professional Edition is that you can develop your new software on any one of these platforms, but build for any other.

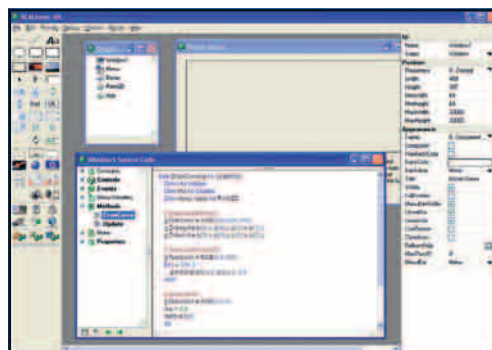
PCPlus ratings

REALBASIC 5.5.5

Value ●●●●●●●●●●
Features ●●●●●●●●●●
Performance ●●●●●●●●●●
OVERALL 8

CROSS-PLATFORM PROGRAMMING TOOL

REALbasic 5.5.5



Developers familiar with RAD-based development will be right at home here.

EXE files that will run on Win32 only. However, if you go for the Professional edition you can create executables for Win32, Linux/x86, Mac OS X and Mac

OS 8 to 9. You can do all this from just one purchased IDE running on one of the stated operating systems. The executables you create with REALbasic are fully self-contained, avoiding those ubiquitous DLL problems. However, there is a downside. The aforementioned executables can be fairly large, perhaps a couple of MB for a very simple Win32 application, and 700 to 800KB for the equivalent Mac OS X program.

In our tests, we found that it was possible to zip the Win32 executable down to around 800KB, while the Mac executable didn't compress much at all.

Increased interest in Linux and the Apple Mac platform, fuelled by the Mac Mini and the new Tiger operating system, means that canny developers ought to at least be thinking about the possibilities of cross-platform development.

REALbasic from REAL Software Inc. is an interesting RAD-based development tool that places strong emphasis on cross-platform programming. If you purchase the Standard edition, you can only build executables for the platform you're currently using. In other words, buy the PC Standard edition and you can create

In short, Mac applications get wrapped inside a built-in compressor, but Win32 applications don't.

The development system is much like Delphi or Visual Basic, with a design-time form that you populate with user interface controls and other non-visual components, such as a TCP/Socket control. Once you've dropped your components onto the form, you can create event handlers and other methods to link everything together. The code editor isn't as polished as that in VS.NET or Delphi, but it does implement syntax-colouring and code completion, which is useful when learning the rudiments of REALbasic.

A large amount of tutorial information is included, and there's an online language reference invoked from the IDE via the [F1] key. For those moving from Visual Basic, REAL Software includes a VB Project Converter that does the conversion work for you, and there's third party support for REALbasic, too. For example, check out the intriguingly named Monkey Bread Software site at www.monkeybreadsoftware.de. **Dave Jewell**

INFORMATION

PRICE £899 (£765 ex VAT)
DELIVERY £40 (£35 ex VAT)
SUPPLIER Watford Electronics
 0870 027 0900
INFO www.savastore.com
WARRANTY One year on site, five years return to base

SPECIFICATION

CPU 2.2GHz AMD Athlon64 3500+
RAM 512MB DDR
CORE LOGIC nVidia nForce 4
HDD 180GB Seagate Barracuda 7200rpm
DRIVES Sony 16x DVD±RW, 16X DVD-ROM
GRAPHICS MSI Nvidia GeForce 6800GT
SCREEN none
SOUND Nvidia nForce 5.1
SPEAKERS none
COMMS Dual 1GB Ethernet
PORTS 6x USB 2.0, 2x IEEE1394, PS/2 keyboard and mouse, Serial, Parallel, 2x S/P DIF, 5 X Audio, S-Video out, Dual DVI
OS Microsoft Windows XP Pro x64
OTHER SOFTWARE MS Works, Nero, Roxio CD Suite 7, Panda AntiVirus and PowerDVD

FIRST WINDOWS XP X64 PC

Watford Aries PowerXS 6464

First out of the blocks with a Windows XP x64 machine – in what will doubtless soon turn into a race of London Marathon proportions – is Watford Electronics. Interest in the PC Plus office has been intense, and we have high expectations, as this is the first machine to bundle Windows XP Pro x64 with a true 64-bit processor.

So how does it fare? First impressions are that externally it looks rather average. There are some token attempts at styling, including a power button with an Aries logo. But they're convincingly middle of the road, and visually this is less of a boring beige box and more of a boring black one, with a typical plastic-feel trim. On the plus side, it's a very easy case to open. No tools are needed, and you can be inside in seconds by unscrewing one nut and releasing a couple of clips. Internally the wiring is exceptionally neat, with plenty of free space and clear access for expansion. The PSU is a standard 400W affair, and the processor is fitted with a suitably hefty heatsink and fan. The noise it generates is average for today's models. But this isn't a silent machine, nor is it a gamer's 'screamer', although it does get more raucous when pushed. A manual fan control switch is included, but it's rather stupidly positioned on the back of the case.

Connection options are thorough: at the front, under a somewhat fragile flap, are two USB 2.0 ports, a FireWire connector, and a headphone and microphone socket. Further up the panel is a combined floppy disk and removable media slot, with room for CF/Microdrive, MS, SD/MMC, and SM cards. This is all good news, and instantly scores points for digital media credibility.

Near the top of the case there's a Sony DW-D22A dual layer DVD rewriter, which can record at up to 16X with +R media, and also a DDU1613 ROM drive. Both are good models; but they do lack frills like a precision tray mechanism. Both drives work reliably though, and are popular choices with system builders. A connection bay at the back is groaning with USB ports, digital and analogue audio, and two gigabyte LAN connectors. Nostalgia fans will

64^{bit} ON TEST

The first machine to ship with 64-bit Windows isn't much to look at, but it's what is happening inside that counts.



appreciate the inclusion of traditional parallel and serial ports. Two DVI connectors and an S-Video out completes the picture.

Internal touches

Internally the case is impressive with clip-on fittings for both bays and boards, and rounded metalwork to prevent cuts. There's also a spare bay for an extra cooling fan. The main components are decent, but not exceptional: an AMD Athlon64 3500+ processor running at 2.2GHz, 512MB of RAM, and a 180GB ATA disk. Four spare SATA sockets and plenty of empty bays again reinforce the impression that this is a machine designed for expansion. A nice finishing touch is a graphics card cooler fan on the motherboard, to supplement both the main processor cooler and the card's own fans. The included RAM might seem miserly, but Watford offers a custom-build option on its website, so if you want more, and you probably will, you can add it while making your initial order. Two slots remain free for this. As a barebones system unit there's no monitor, keyboard or mouse. Windows XP Pro x64 is included, as are MS Works, Nero, Roxio CD Suite 7, Panda AntiVirus and PowerDVD. while MS Office – currently 32-bit only - is available as an option.

And so to the burning question of performance. Sysmark isn't quite ready for prime time in a 64-bit environment, so it wasn't possible to get an overall score. But 3DMark 03 and 05 worked without a hitch, and reported scores of 10903 and 4641 respectively. Thanks to the dual-head GeForce 6800GT card, these are ahead of the pack, but a

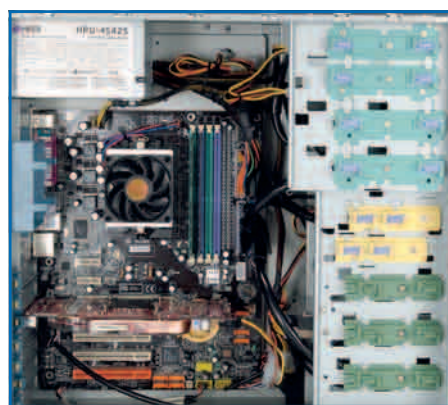


It's strange to see an old-fashioned FDD with this PC.

notch or so lower than we would expect from a self-styled, full-on performance system. Memory throughput was good, and SiSoft Sandra clearly showed the processor pulling its weight.

All told this is the proverbial mixed bag PC. Physically it may not look like much, but it's a joy to upgrade. Performance is good but not stratospheric. It's better than mid-range models, but not quite up to the heights of the leaders. Overall if you're looking for an ultimate Windows XP Pro x64 PC, this isn't it. Nor is it quite the games machine of ultimate doom. (Or indeed Ultimate Doom.) Instead it's a good mid-level, all-round PC with go-faster stripes, and can offer a helping hand with number crunching and is plausible, but not top flight for games. We can't quite recommend it for being outstanding in any way. But you'll find that it offers a decent deal overall.

Richard Wentk



The Watford Aries PowerXS has great upgrade potential and is easily accessible.

PCPlus ratings

**WATFORD ARIES POWERXS
6464**

Value 1 2 3 4 5 6 7 8 9 10

Features 1 2 3 4 5 6 7 8 9 10

Performance 1 2 3 4 5 6 7 8 9 10

OVERALL **7**

INFORMATION

PRICE TBA
SUPPLIER Microsoft 0870 60 10 1000
INFO www.microsoft.com

REQUIREMENTS

CPU 64-bit Intel or AMD processor
RAM 512MB minimum
OS n/a

IN A NUTSHELL

It's just like 32-bit Windows, but able to handle more memory. The bottom line is that if you need to run applications that use more memory or access a bigger dataset, then WinXP x64 is definitely for you. For more casual use, the benefits are less clear cut. Older 32-bit apps won't run any faster, and so far only a handful of true 64-bit apps are available. Once more new apps appear, buyers will be able to get the maximum benefit from a 64-bit system. In the meantime, this is more of an incremental than a revolutionary update.

64-bit
ON TEST

OPERATING SYSTEM

Windows XP Pro x64

At last it's here: the Windows version that will finally unleash the full power of the new 64-bit processors. The good news is that in spite of earlier statements and rumours about OEM exclusivity, off-the-shelf versions of XP x64 will be available to the likes of you and me. At press time Microsoft still hadn't announced a price or whether or not there will be an upgrade path from existing Home and Pro versions, so for this review the question of value for money remains an open one.

The biggest issue

The first thing to note is that the interface is identical to the one in Windows XP. There are one or two minor differences which we'll list later, but for the most part Windows x64 looks and works just like the previous version, with no hints of the possible changes to come in Longhorn. On the plus side, this means there's nothing new to learn. On the minus side, some new features always make an upgrade more attractive, and with no shiny new add-ons or extras to drive sales Microsoft is presumably banking on the 64-bit proposition being strong enough to inspire buyers in its own right.

Looked at in detail, that proposition may not seem like the world beater that everyone was hoping for. The single biggest difference is that Windows x64 has a much larger working memory space. Windows XP tops out at 4GB. This is still currently more than most people use, but

within a year or two it may no longer seem extreme. Windows x64 potentially extends that space to 128GB of physical RAM and 16TB of virtual memory, which should offer at least another eight to ten years of development. This is good news for power users who work with towering mountains of data, because 3D animation, power spreadsheet users, video makers and other content creators stand to benefit substantially. HiDef video and poster-sized Photoshop projects are a struggle with current hardware, and an expanded memory area will go a long way to making them more manageable. But you may need it if you want to create huge RAM-based



Meet the new desktop, which looks remarkably like the old Windows XP desktop.

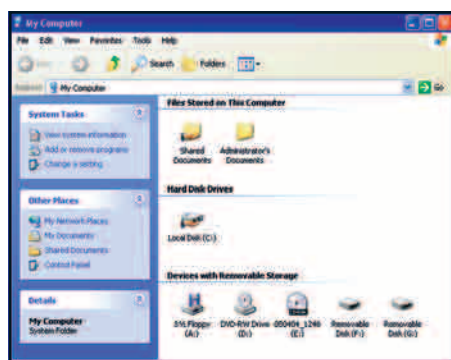
previews of HiDef video, work on an image with dimensions wider than 10,000 pixels, or produce a 3D animation that features thousands of individual virtual actors. The common thread here is that the most obvious benefits will go to users of high-end professional and scientific applications. On the other hand, you don't need 4GB of RAM to edit your holiday snaps or splice together a home video for your web page. You certainly don't need that much memory to read email and browse the web.

But what about gaming? The memory difference for gamers is a moot point, because textures are more often limited by graphics card RAM than by system memory. Some games houses have been considering pre-load systems which background buffer all the information for the next level while players work through the current one, potentially cutting down or even eliminating long loading times. This is the kind of application that could benefit from a bigger memory space, but otherwise extended memory is more of a longer term proposition, something that may become relevant in a couple of years once the development cycle catches up.

For everyone else, the memory issue is unlikely to be a major selling point. Most potential buyers will be more interested in obvious speed jumps. This is a shame, because for the most part there won't be any. The harsh reality is that a 64-bit processor running Win x64 will only run 32-bit

apps very slightly faster than a 32-bit system, if at all. What's more worrying is that speed increases for native 64-bit apps may not be as significant as buyers have been hoping. Misleading reports have suggested that just because the processor grabs twice as much information at once it will run twice as fast. This is just plain wrong. It's true that memory bandwidth gets a huge boost in a Win x64 system, but inside the processor only a subset of operations are any faster. In preview tests we found speed hikes of between 10 and 40 per cent depending on individual features in the various 64-bit apps that are available. Some of these apps, such as Adobe Creative Suite 2, were still in beta, and so might not offer an entirely fair test. Even so, a 50 per cent speed increase would be exceptional – as a rule of thumb, 30 per cent could be considered a success, and rather less than that might be more plausible for many applications.

The one exception to this is multi-processor support. Windows x64 can handle up to two processors at once, and for added power they can be multi-core models. Again, this will mostly interest professional power-users. Gamers may also benefit, but



Another familiar face from Windows XP. No need to worry about not being able to find your way around.



There's a new 64-bit version of Internet Explorer. But it's still IE6 under the surface; no sign of IE7 yet.



AMD's website lists some of the 64-bit projects in development.

this will depend more on clever programming to optimise the 64-bit effect than on a simple speed bump caused by the technology itself.

Looking back

In theory, old 32-bit apps should work without problems in Windows x64. A subsystem called WOW64 runs 32-bit apps in a separate process. Registry and cache management is independent, and a feature called a Registry Reflector makes sure that file associations are maintained across both Registry views. There are a few other minor wrinkles like this. For example, the System32 directory is now reserved for 64-bit apps. 32-bit apps are retargeted to a WOW64 directory. In practice, this means that compatibility is more or less seamless. Older apps will install and run, although in our tests we found that a few very old apps, such as Acrobat v5, stopped and wouldn't load. Most worked with absolutely no problems. As a footnote, Win x64 spells the end of ancient 16-bit apps because they won't run at all. This may disappoint the old DOS die-hards, but won't worry most users. Another footnote is that you can't install Win x64 on 32-bit hardware.

In the other direction, Win x64 includes 64-bit updates of only a few of

its core applications. The most notable is IE6, which is unchanged externally, but in some very informal testing seemed to be slightly faster than its 32-bit sibling. Wordpad has also been updated, but Outlook Express hasn't. For that we'll have to wait for Microsoft Office, which is being updated for 64-bit but is unlikely to appear until next year.

So what's the verdict? Almost exactly 10 years ago, Microsoft announced Windows 95 to the strains of a PR campaign that's never quite been equalled. The benefits of Windows 95 were obvious. It offered not just a new programming model but a much-improved new interface. With this release, backwards compatibility has become a major issue, which means that Microsoft can't try the same stunt again, no matter how much it might want to. The huge volume of 32-bit apps means that any OS that tried to abandon them would be doomed.

So this is almost a halfway house release. Microsoft is to be congratulated for doing an excellent job of maintaining backwards compatibility, but this is really just Windows XP with a bolt-on 64-bit add-on, rather than a whole new operating system. Longhorn may or may not prove to be that new OS in the medium term. For now, Win x64 will convince power users and extreme technology addicts, and new purchasers will get it bundled with their machines as a matter of course. But for upgraders of older hardware, it actually offers very little. If your current PC has 1GB of RAM, it will be at least a couple of years before you cross the 4GB threshold. The real question for this OS isn't whether or not it's worth buying now, but whether or not the next generation of 64-bit apps will make it so.

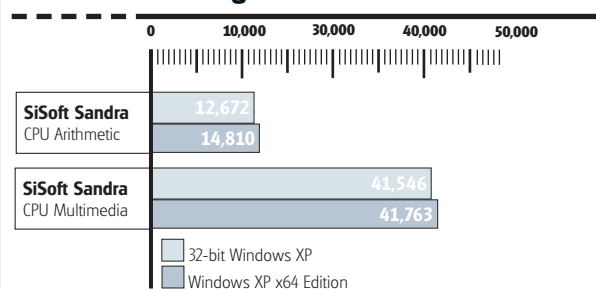
Richard Wentk

Benchmarking Windows

It's impossible to offer an absolute benchmark comparison, because real-world performance depends as much on system components as on the OS. But we tested Windows x64 vs Windows XP Pro on the same machine to get some indicative results.

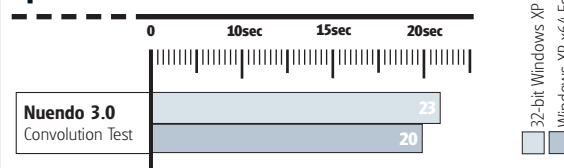
The Nuendo Convolution Test is a memory and CPU-intensive editing operation on two large files. It's included as a sample of the few 64-bit ready applications available now. The results speak for themselves. Arithmetic is around 15 to 20 per cent faster, but for more general CPU intensive work there's very little in it. The real-world figures support this with a noticeable but far from spectacular speed improvement. ■

Performance rating



Bigger is better

Speed test



Shorter is better

PCPlus ratings

WINDOWS XP PRO x64

Value	N/A	●●●●●●●●●●
Features		●●●●●●●●●●
Performance		●●●●●●●●●●
OVERALL		7

What of the apps...

Nuendo 3 is doing its 64-bit thing. Does anyone else feel like joining the party?

So which apps are already available in a native 64-bit format, and which are due soon? In the long-term it's a fair bet that most current products will eventually work their way into the full 64-bit 'hood. But it's not clear how long this process will take. For now the flagship 64-bit product is Adobe's Creative Suite 2. At press time, final copies weren't yet available, but testing the beta versions showed that significant speed increases are available, although it would be stretching the truth to call them dramatic or awesome. Products such as Steinberg's Nuendo 3, which shipped early this year with 64-bit support, are in a similar place, offering enough extra speed to be noticeable, but not quite making serious waves. Lightwave is due by the end of the year, and 3DS Max is another possible arrival. Microsoft itself is working on Office. Because of its nature, it's even

less likely to show a huge speed jump, although spreadsheet power users and document editors will appreciate the potential offered by extra memory, which can often do more to speed up real applications than raw processor grunt.

The good news for developers is that converting to Win x64 is more or less just a case of recompiling with 64-bit support enabled. It's likely many developers will do exactly this, and many apps will be given a slight speed bump like this. But it's also a slightly lazy approach, because getting the best from 64-bit means thinking carefully about how data structures are organised and maintained to take the best advantage of the enhanced memory bandwidth and processing ability of 64-bit hardware. Floating point operations, for example, won't be much faster without this kind of fine tuning. Overall this is really

a transition period. Windows x64 has arrived with more of a murmur than a bang, and it's going to take a year or so for the rest of the industry to catch up.



Steinberg's Nuendo 3 offers 64-bit support, but it's not yet making serious waves in the industry.



Guide to your SUPERDISCS

GUIDE TO THE JUNE 2005 SUPERDISC

Follow our project-based tutorials to find out how to use all this month's great free software...

This month's SuperDisc software tutorials



PAGE 189
Registry Mechanic 3

Give your Registry a service, locating and fixing corrupt or redundant entries



DVD EDITION All this month's software can be found on the DVD. Get creative with Roxio PhotoSuite 5 SE, visualise your thoughts with ConceptDraw MINDMAP 2, sell your products online with SmartStore.biz 3.1.17 Advanced, and try out Aspose.Excel 1.5, Mepis Linux 3.2, QSetup Installation Suite 4.0.1.0, Registry Mechanic 3 and Spyware Doctor 3.



PAGE 181
Roxio PhotoSuite 5 SE

Automatically fix your digital photos and get creative with slideshows



PAGE 183
ConceptDraw MINDMAP 2

Let your mind wander, and relax as this tool organises your thoughts



CD 1 If you bought the CD version, you'll find Roxio PhotoSuite 5 SE and ConceptDraw MINDMAP on Disc 1.



PAGE 184
SmartStore.biz 3.1.17 Advanced

Turn your product details and images into a professional online store



CD 2 On Disc 2, you'll also find SmartStore.biz 3.1, Registry Mechanic 3 and QSetup Installation Suite 4.

CD+DVD PRODUCTS

Roxio PhotoSuite 5 SE	181
ConceptDraw MINDMAP 2	183
SmartStore.biz 3.1.17 Advanced	184
QSetup Installation Suite 4.0.1.0	187
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DVD ONLY PRODUCTS

Aspose.Excel 1.5	186
Mepis Linux 3.2	186
Spyware Doctor 3	189

TECHNICAL SUPPORT

Our support staff will do their utmost to help you, but cannot provide assistance for either Linux software, or general application help for hardware, DOS or Windows.

Difficulties with your software?

CONTACT PC PLUS CD AND DVD READER SUPPORT

Email pcplus.support@futurenet.co.uk
Tel **01225 822 743**
Website www.futurenet.com/support
Forums <http://forum.pcplus.co.uk>

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DAMAGED SUPERDISC If your cover disc appears to be faulty, please call our reader support team.

FULL PROGRAM

GRAPHICS SUITE

Roxio PhotoSuite 5 SE

PhotoSuite 5 enables you to import images from memory cards or digital cameras, and automatically fix common problems with the PhotoDoctor. You can then get creative with your photos and design a calendar, gift tag or postcard, or share your work with others

REQUIREMENTS

CPU Pentium III 500MHz
RAM 128MB
OS Windows 98SE/Me/2000/XP
OTHER 100MB disk space

SERIAL CODE

www.roxio.co.uk/cd

UPGRADE

Save £20 on PhotoSuite 7 and Creator 7

PhotoSuite 5 is supremely easy to use, but any image enhancements or fixes you apply will affect the entire photo. That's a restriction that disappears in version 7, as new selection and mask tools enable you to work on any object or defined area that you want to tweak. Once your photos are looking perfect, use the 'Media Manager' to organise them into albums. Then start up the new 'Storyboard' feature, which helps you create engaging slide shows with photos, video clips and a soundtrack.

If you need even more CD or DVD authoring power, take a look at Roxio Creator 7, too. It's a digital media suite that combines Roxio PhotoSuite 7, EasyCD/DVD Creator and VideoWave into one package, and much cheaper than buying them separately.

When you factor in our special £20 discount, the price is ever lower still: £2999 for PhotoSuite 7 Platinum Edition, or £4999 for Creator 7. Visit www.roxio.co.uk/adban/pcplus/upgrade to place your order.

www.roxio.co.uk

You're just back from a spectacular holiday, and want to share your great photos with distant family members. Normally this might take a while (you'll have to pick out your favourite shots, tweak them to make sure they're looking their best, resize them to an emailable size, and so on), but PhotoSuite 5 can handle everything in just a few minutes. And you don't need any photo-editing or graphics knowledge at all. Here's how it works.

1 Transfer your photos PhotoSuite 5 can work with your photos individually, like any other graphics tool, but life is much easier if you organise them all into an album instead. Click 'Transfer' in the left-hand menu, then select 'Transfer from new device' to see what's on offer.

If your photos are still in the camera then it should appear in the device list. Click on the device, select 'Next', and use the built-in wizard to transfer your files.

If you've already imported your images, choose the drive where they're stored, click 'Next', and navigate to the folder containing your holiday snaps. Click 'Select all' to highlight every folder, or hold down the [CTRL] key and click the individual photos you need.

Click 'Next', and enter a suitably descriptive name for your photo



The colour balance depicted here doesn't look quite right, but the intelligent PhotoDoctor may be able to fix this in a couple of simple clicks.

collection. Then select 'Transfer' to copy your photos to the new album, or 'Transfer more' if you've got other pictures stored elsewhere.

2 Automatically fix problems

Naturally, you're an excellent photographer, and every shot stands as a clear testament to your skill and ability. But just occasionally the digital camera lets you down, leaving exposure, colour balance or framing problems that need to be addressed.

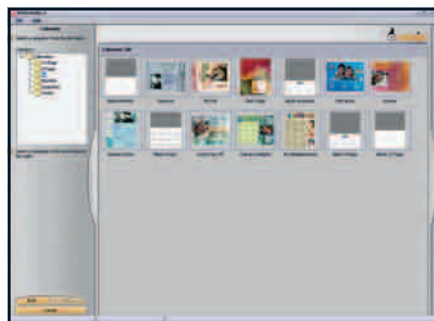
Click 'Edit & Create' in PhotoSuite, then choose the Edit tool. You'll see a thumbnail preview of the newly created

album photos, where you can pick any shot that needs work.

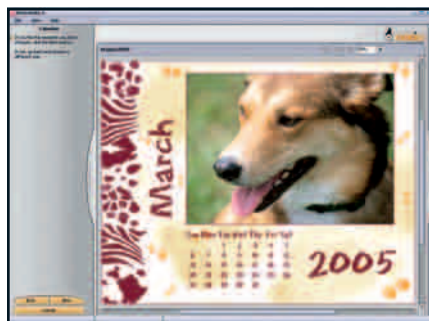
Roxio recognises that typical image editors can be intimidating, so you won't find a host of floating toolbars here. In fact, most problems can be resolved automatically, just by clicking PhotoDoctor | AutoFix. PhotoSuite will analyse and then tweak your photo exposure, saturation and sharpness, then display the new image for your approval. Click 'Done' if you want to accept it, or 'Cancel' if you preferred it the way it was before the program had a chance to tinker with the photo's colour scheme.



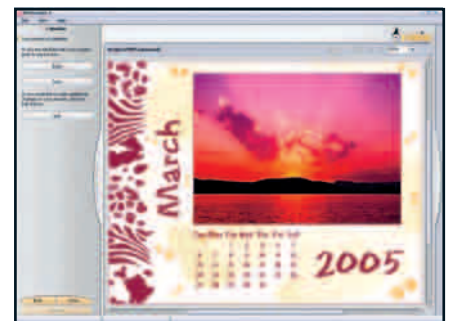
Get creative with your digital photos



1 Along with its image organisation and editing features, PhotoSuite includes a handy desktop publishing element. Want to produce a calendar based on your photos? Then click Edit & Create | Projects, choose 'Calendars' from the 'Project Type' list, and click 'Next' to see a selection of the templates on offer.



2 Roxio comes with calendar designs in every possible layout (monthly, quarterly, yearly and more), so choose the type you'd like to create from the left-hand menu first. Then browse the templates in the main work area, select your favourite design and click 'Next' (we'll replace the photo in a moment).



3 Click 'Next', choose which year and month you'd like the calendar to begin at, and select 'Next' again. Click 'Replace Photo', then choose a preferred image from a PhotoSuite album, or any other file on your hard drive. Click 'OK', move and resize the new photo if necessary, then print the finished page.

Interface at a glance...

Menu bar
Most options are available from the Edit buttons, but there are also extra features in the menu bar

Edit Features
All the editing options you currently have available are displayed here

Show All Features
This button switches PhotoSuite 5's simple mode and advanced mode

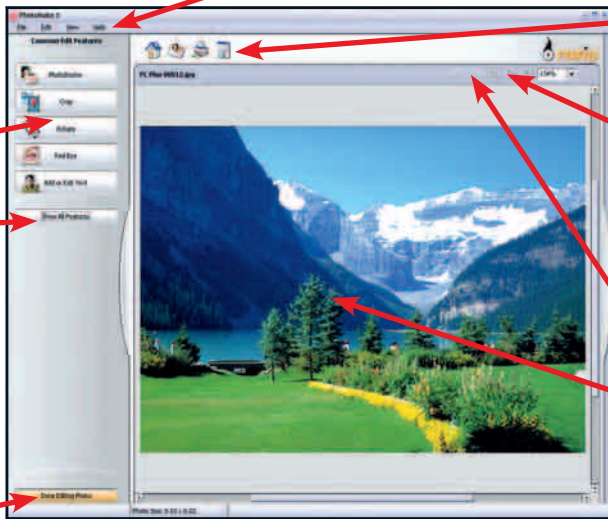
Done Editing Photo
Click here when you've finished, and save the reworked image if you're happy with it

Toolbar
The toolbar provides shortcuts to the homepage, or email, or to print or save

Zoom
See the fine detail up close, or pull out to see the bigger picture with these zoom tools

Undo/redo
The undo and redo buttons will help you recover previous versions of the image

Workspace
Use the scroll bars to navigate your photo, or right-click for rotation and other options



3 Take more control Automated processes like PhotoDoctor are great for beginners, but if you're familiar with image editing then you'll probably want to take more control. Click 'Show All Features' and you can do just that.

PhotoDoctor now disappears, and you're given access to an 'Overall Quality' menu instead. Here you can manually adjust exposure, saturation, sharpness, tint, brightness or contrast, to get the best possible results.

Other functions can clean up your relatives, removing red eye, blemishes or wrinkles, and there's a range of options designed to fix damaged photos, too. You can remove dust or scratches, or fill in missing areas and add a few quick special effects with the powerful Clone tool. This is the ideal way to let Granny meet Jaws, without having to bring a mop and bucket to clean up the mess.

The best part comes in the Special Effects menu, though. You get lots of options, over 100 in fact, and they all come with individual previews to show how they work. Better still, most effects can then be customised further for some very interesting results, and in many cases, may be good enough to justify installing PhotoSuite even if you have other editing software.

4 Create a slide show Now your photos have been polished into a state of professional perfection, they should be ready to be shared with other family members. And perhaps the best way to do that is via a slide show (Print & Share | Slide Show).

Select 'Create a new slide show', click 'Next', and choose any images you've worked on recently to be included (click 'Add More Photos' if they're not all shown). Drag and drop

any chosen photos into the order you'd like them to appear in the slide show.

Click 'Next', then work your way through the slide show, giving each photo an appropriate caption. You can take the opportunity to personalise your show some more by clicking 'Record' and narrating a soundtrack about the photo for your viewers. As always, try to keep this short; even when someone's playing something from a DVD, they do have other things they'll want to do in their lives.

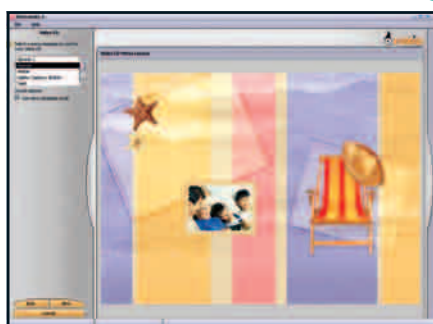
Click 'Next' again, and select Email | Package Slide Show | Next. PhotoSuite combines your photos and soundtrack into a stand-alone executable file that you can either email immediately, or (if it's too big) distribute on CD. Save the file, and your slide show is complete. All your viewer needs to do is pop it into the drive and run the file; everything else runs itself. **PCP**

FURTHER INFORMATION

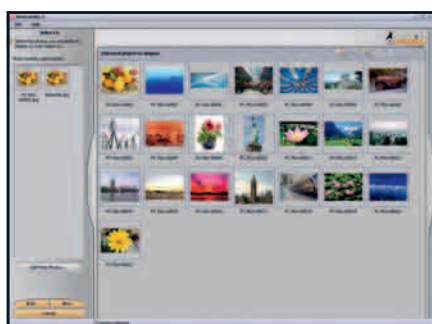
 StripFile (www.nuertools.co.uk) may be able to compress your JPEG files so they take up less disk space, but be sure to back up your images before trying it.

Email SuperDisc problems to pcplus.support@futurenet.co.uk

Create a video CD of your favourite shots



1 There's a limit to the size of slide show you can send by email, so if you're sending lots of images, a video CD is preferable. Click Print & Share | Video CD to begin, select 'Create using photos only' and click 'Next'. Now choose your menu background and music, and click 'Next' again.



2 Choosing your images here works just like the slide show feature we discussed earlier. You can drag in photos you've worked on recently, or click 'Add More Photos' to see others. Then drag and drop the images into the order you'd like to see them appear on the finished disc. Click 'Next' once you've finished.



3 Every photo can be given its own caption and voice notes, if you've got enough disc space (click 'Calculate Disc Size' to find out). Give your disc a title, and preview the finished results with the virtual remote control. Click 'Back' to change something, otherwise select 'Record' to produce the finished disc.

VISUALISATION TOOL

AS SOLD FOR £53

ConceptDraw MINDMAP 2

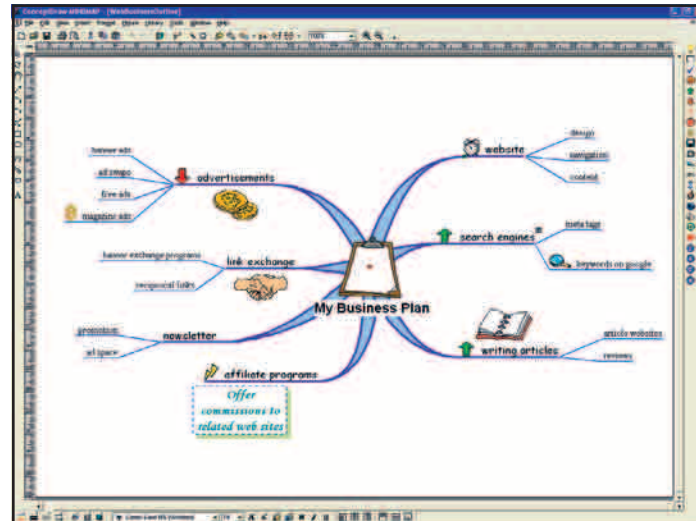
Got a report to write, a presentation to plan, an application to design? If you're completely stuck for ideas, MINDMAP could help. This brainstorming tool enables you to express your ideas in a visual form, then add other topics and rearrange them into a clear, structured form

ConceptDraw MINDMAP is an ideal tool for business, enabling you to get more out of meetings and clearly present ideas and concepts. But how can you persuade your manager that investing in the software is worthwhile? Producing an effective presentation could do the trick, and MINDMAP is just the tool to help get your message across.

1 Create a new mind map You can create mind maps from a blank page, but it's easier to Click 'Create a new mind map with the assistant' on the Start-up screen. Enter a title for your map (we'll call it 'Why use MINDMAP?'), then pick an image to represent it. The default image library is 'Foods', which isn't too appropriate, so pick the 'Symbols!' library instead, choose a business-like image and click 'Next'.

2 Enter some topics Try to identify the main areas you'll be covering in your presentation. In this case, you might come up with 'How we make decisions now', 'ConceptDraw MINDMAP Capabilities', 'Benefits of using MINDMAP' and 'Cost and implementation issues'.

Enter each idea as you think of it, and click 'Add topic to list'. Don't worry if the list is incomplete or you're unsure about particular items, because this is just a starting point, and you'll be able



Enter ideas as you think of them and MINDMAP will organise them into a tree. You can then move branches until you've got a visual form you can share with others.

to change things later. Click Next | Finish to accept the default style, and your initial map will be created.

3 Start brainstorming Pick a branch on the map, such as 'How we make decisions now', and come up with related thoughts. Maybe meetings are a relevant issue? Right-click, select 'Add branch' and enter 'Meetings' as the new topic. Repeat the process at other branches and you start to build a tree of ideas. Drag and drop branches when you need to make more space, or right-

click on a branch and choose 'Detach' if you want to move it somewhere else. Finally click File | Save As to save the map as an image, or an HTML file ready to put online. **PCP**

FURTHER INFORMATION



Find out more about how mind maps can be used from Tony Buzan, inventor of the technique back in the 1960s. Go to www.buzan.com.au/learning/mindmapgallery.html.

Email SuperDisc problems to pcplus.support@futurenet.co.uk

REQUIREMENTS

CPU 500MHz or faster
RAM 64MB minimum
OS Windows 98 or later

SERIAL CODE

Visit www.conceptdraw.com/registration/mmspecial.php

UPGRADE

Save up to \$100

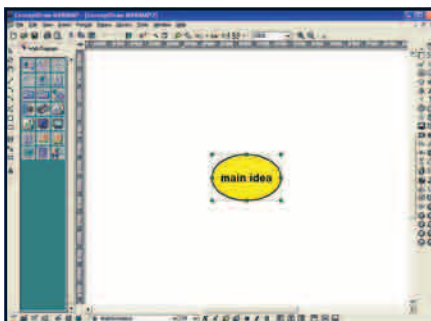
The latest version works much faster when you're creating complex, large maps. A new Outline view enables you to create a map from its text description, while still providing the freedom to change fonts and styles, and add hyperlinks or text notes to branches. Colours, numbers or graduations help show the relationship of one branch to another.

Opt for the Pro version and you'll also get support for multiple maps within one document, along with the ability to edit and create your own libraries. PowerPoint slides and Outlook tasks can be imported, while your finished maps can now be saved in PDF format.

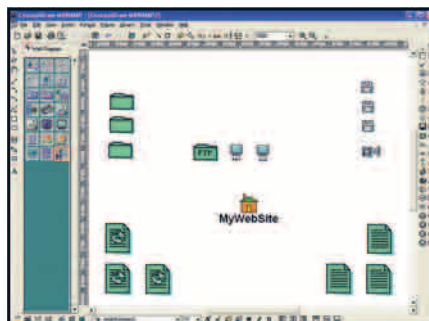
MINDMAP Standard version is normally priced at \$149, while the Pro version weighs in at \$199, but as a registered owner of MINDMAP 2 you need only pay \$79 (£42) or \$99 (£53). Choose the version you need at the ConceptDraw upgrade page www.conceptdraw.com/en/purchase/mindmap/upgrade.php.

www.conceptdraw.com

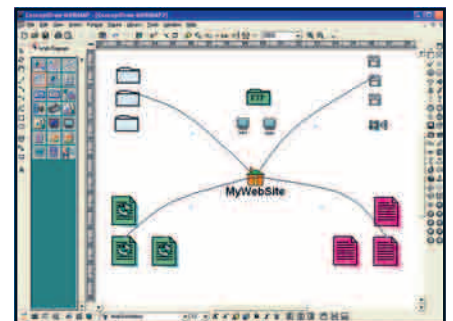
Use MINDMAP to create a graph of your website



1 MINDMAP is equally at home with other types of graphs. Want to represent your website? Click File | New | Document, then select File | Open Library and select | Program Files | CS Odessa | ConceptDraw MindMap | Libraries | Computers | WebDiagram.CDL. The new symbols will appear to the left.



2 Double-click on 'main idea', then enter the name of your website. Right-click on the central box, select 'Change Central Theme Image', add the WebDiagram.CDL library here too, then select the 'Home' symbol. Now drag and drop symbols across from the library onto the page until you're happy. *nished.



3 To change the colours, right-click any symbol you like and select Format | Fill & Shadow. Now drop a 'dynamic connector' onto the page, then drag one end onto the centre homepage icon, another onto the symbol you'd like to connect. The handle changes to a square when it's connected. Repeat until you're done.

ECOMMERCE SITE GENERATOR

AS SOLD FOR £345

SmartStore.biz 3.1 Advanced

Creating your own online store doesn't require an in-depth knowledge of scripting or databases. Just tell SmartStore.biz about your products, add some text and images, and it'll package everything up into a professional online shop, based around static HTML pages

REQUIREMENTS

CPU 266MHz or faster
RAM 64MB minimum
OS Windows 98 or later
OTHER Internet Explorer 5.0 or later

SERIAL CODE

Visit www.smartstore.com/FN/PCPlus0505/biz/ and enter the campaign ID **FNCPPlus0505biz**

UPGRADE

Upgrade to SmartStore.biz Professional

SmartStore.biz Advanced is more than capable of running most online stores, but if you've got heavy-duty requirements, SmartStore.biz Professional could be the answer.

Upgrade to this version, and you can import XML product catalogue data, removing the need to manually enter details, and there's no limit to the number of products your catalogue can hold.

Other extras include marketing tools for setting up cross promotions and global discounts. You'll also get extra customisation tools, with a full Form Editor.

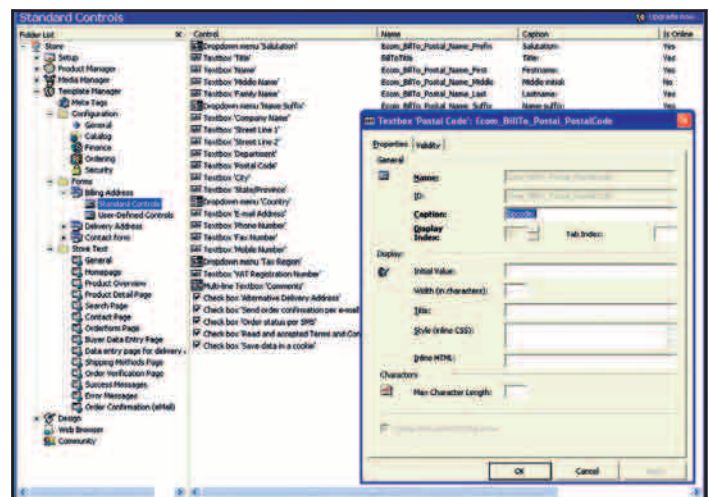
Sounds interesting? SmartStore.biz Professional would normally cost £500, but as an Advanced version user you need only pay £340. Click on '?' in the toolbar, then 'Licence' followed by 'Upgrade Now'.

www.smartstore.com

This ecommerce tool is a great way to take the technical pain out of creating a web shop, but of course that doesn't mean you'll be online and making money in five minutes. There are still many tasks you have to complete, from defining your product catalogue, to deciding exactly how much you'll charge to post an order to Trinidad and Tobago, say. You should still have the basics set up within one evening, though, which is far quicker than you'd manage without assistance SmartStore.biz. Here's how to get started.

1 Data entry SmartStore.biz opens with what seems like quite a complicated interface, but take a closer look and you'll find it's really quite straightforward. The program is just offering three different ways to navigate around your various site management tasks (a Themes bar, Folder List and Start task list). It's good to have the choice, but you don't need all of these, so we would start by turning off the left-hand Selection Bar, which you can do by choosing View menu and then 'Selection Bar'.

Now we'll navigate through our site set-up tasks using the Folder List, instead. To begin, expand the first Set-up section of the tree, and click on 'General Data'. Here you'll see information that will be used to



Every word of text can be customised to suit your needs (so click Template Manager Forms | Standard Controls if you'd like to change 'Zip Code' to 'Post Code').

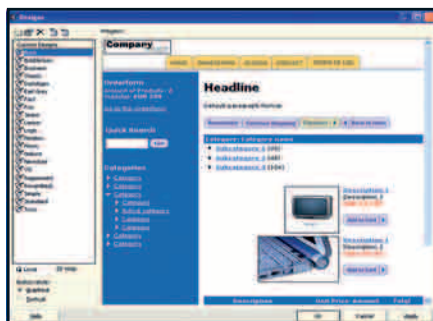
generate your site, like company name, address, phone and fax numbers, and so on. Double-click on any you would like to fill in, and enter your text into the box provided.

Repeat this process for email settings, then browse the other Set-up sections to see exactly what options are available. Press [F1] if you would like more help on a page, but don't worry about completing every section now. The defaults are fine, and you can always come back and change something later. If you realise you've made a mistake during the process.

2 Describe your products Next you should start thinking about how your products can be described, or setting 'attributes' in SmartStore-speak. These are variables that the user gets to choose from when they order. We're creating a T-shirt store, in our example, so we need to have a choice of size, colour, design and slogan.

Once you've developed a list, expand Product Manager | Attributes to enter the details. ID is just a unique identifier for this attribute (start at 1 and work upwards), while 'Display Name' is the attribute description you

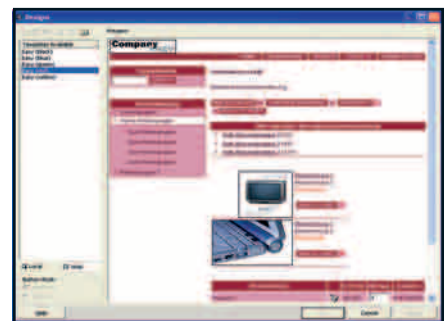
Add a professional design in 15 seconds



1 Template-based web designers tend to produce poor quality sites, but not this one. In fact, even the default design looks as good (if not better) than most other online stores (click on 'Preview in browser ...' to find out for yourself). But you want to see what else is on offer? Click Tools | Designs.



2 There are 21 designs listed on the left hand side, from the plain 'OS' and subdued 'Business', to the cheerful 'Lemon' or eyeball-searingly gaudy 'BubbleGum'. Scroll down the list clicking on each one in turn, take a look at the preview, and if you like it, click 'Apply' to give your site that look.



3 Some designs can be customised here by choosing to have text, rather than graphical buttons (this can give the site a more serious look, as well as making it faster to load). There are also a few templates available online, although you must download these before they can be applied.

The interface at a glance...

Tool bar
The toolbar includes a browser-like 'Back' button for retracing your steps, if needed

Selection bar
Jump straight to a particular store management task by clicking on its icon here

Folder list
The tasks listed in the Selection Bar are broken down here into their separate areas

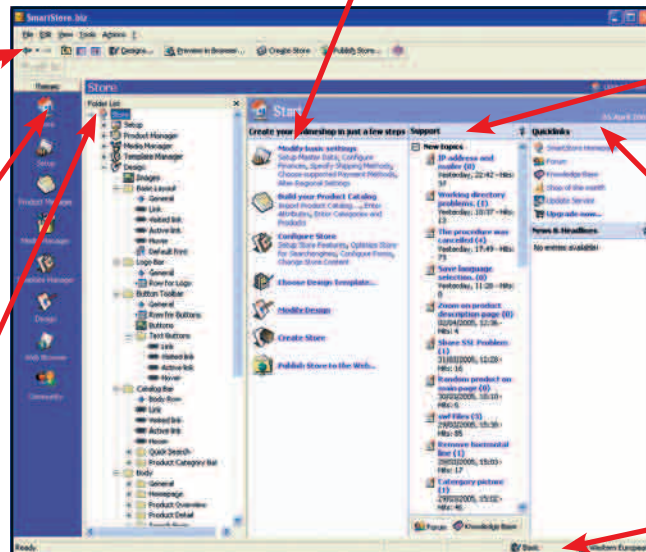
Task breakdown

The SmartStore home page also includes a list of the steps involved in setting up your store

Support Section
Check the Help first, then browse the User Forum here for more helpful information

Quicklinks
What you're viewing here is actually a web page, and these are links to other site areas

Status bar
Basic information about your store, like the current design template we're using



would like the customer to see ('Size'). 'Type' is text for a standard setting ('Cotton'), 'Yes/ No' is for an option ('Long sleeves?'). You need to include a 'Value List' if you intend to give your customers several choices (size, colour and so on).

SmartStore also expects you to create a tree of Categories for your products, which you can view as something like a site structure. What's the first layer of navigation going to be? Our T-shirt site could start with 'Personalised', 'Pre-Printed' and 'Plain', for example. Each of those could break down into further sections ('Adults' and 'Kids', for example)

Categories work like folders in Explorer, so right-click on the menu and choose the 'New Category' option to create the top-level choices, then repeat the process within each of your

categories to create any others that you think you will need.

3 Add a little visual appeal To begin entering your products, just click in a category and fill in the details, such as item number, description and price. Mark an item as a 'Top Product' if you would like it to appear on the home page.

You could have a site with text-only descriptions, but customers generally appreciate being able to see what they're buying. Right-click on each of your products, then assign a thumbnail picture and full-scale image, if you have one. (You don't even need to worry about sorting out the file conversion, SmartStore accepts most common graphics formats, and will even convert a product image to JPG for you).

The images will help give your site some individuality, but there's more work to be done. Expand Template Manager | Store Text, and you'll see the default text used throughout the site. Most of the default text is little bland, to put it mildly; do you really want the subject line for any email from your site to read "Message from the online store"? Instead, personalise your store by changing it to "Hi, beloved customer of T-Shirt-Shop.com" (or something similar).

There's plenty of small details left to complete before you'll be ready to actually go online and start selling your wares, but by now you've created the bulk of the shop, and have an excellent base to work from. This is the ideal point to take a break, click Tools | Preview in browser, and admire the results of your work so far. **PCP**

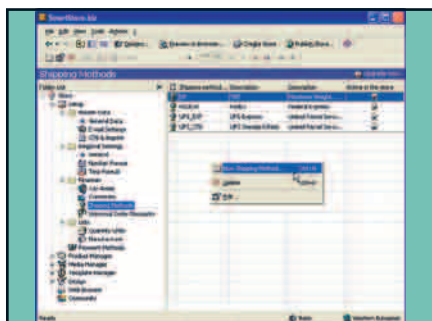
FURTHER INFORMATION



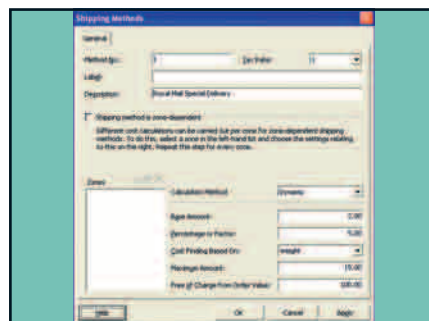
To take credit card payments for customer orders you'll need a merchant account from a payment provider like WorldPay. (www.worldpay.co.uk).

Email SuperDisc problems to pcplus.support@futurenet.co.uk

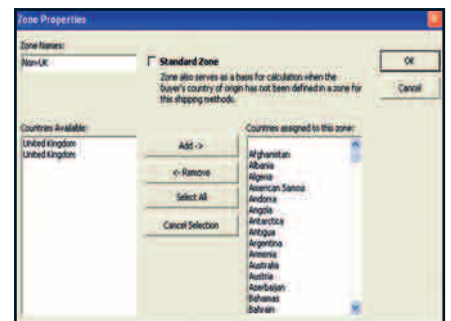
Customise every aspect of your store



1 Everyone has their own ideas about how they want to do business, so SmartStore.biz gives you complete control over the operation of your site. Take shipping methods, for instance. The defaults are all for the US, so you'll want to add a few British options by right-clicking. Select 'New Shipping Method'.



2 Initially the shipping cost is calculated as a static figure (such as 'always £5'), with the option to say it's free if the customer spends more than a defined amount. If that's too basic then try the dynamic calculation, instead, where shipping cost is recalculated according to the price, or weight.



3 Orders from abroad will also cost more to ship, so you'll want to take that into account, as well. Check 'Shipping method is zone-dependent', then select the 'Add new zone' button. Now you can collect together countries into as many different pricing zones as you like or just have two: 'UK' and 'non-UK'.

**AS SOLD
FOR £249**

MICROSOFT .NET COMPONENT

Aspose.Excel 1.5



Aspose.Excel is a non-graphical .NET Word document reporting component

REQUIREMENTS

CPU 300MHz or faster
RAM 128MB minimum
OS Windows 2000 or later, a .NET development environment

SERIAL CODE

Not required.

UPGRADE

Since the release of Aspose.Excel 1.5, there have been many improvements: stream support, CSV support, SpreadsheetML support, Xls2Pdf support, Smart Marker feature, optimisation on file size, speed and memory, formula enhancement, chart API enhancements, data source import/export methods, autofit methods, Find/Replace methods and much more.

www.aspose.com

Similar to last month's Aspose.PDF, Aspose.Excel can be used in conjunction with Microsoft Excel to produce a very powerful, yet easy to use report designer.

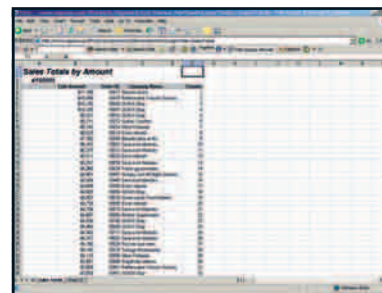
1 Creating the template Creating a basic report template is truly as easy as creating a standard spreadsheet in Microsoft Excel. No longer do developers or end-users have to worry about complex or proprietary report designers. You simply design the template in Microsoft Excel just as you would like to see it printed. Report templates can contain any number of pre-built elements, including complex text effects, tables, images, charts and much, much more. What's really good about being able to use a familiar designing application is that end-users can become much more involved in the report designing process.

2 Inserting the data fields Once a basic report template has been created,

you, as designer, will need to determine where the dynamic data is to be added. Wherever in the report template you would like to have data, you can simply insert a Field Name that can be referenced by the developer. You'll then need to proof the document in order to insert something called a Smart Marker, that can be recognised from your application.

3 Create a finished product

The final step in the process is for a developer to create an application using Aspose.Excel to enable the processing of the document. Aspose.Excel can be used to take data from a DataSet, DataTable, DataView, DataReader or an XML file, and merge it directly into the spreadsheet. With very few lines of code required, another developer can open the document template and immediately populate it with valuable report data. **PCP**



You'll be able to access Excel in any of your programs with this powerful and flexible .NET component.

FURTHER INFORMATION



For the latest in Aspose.Excel demo applications and the most recent evaluation version of the product, be sure to visit www.aspose.com/Products/Aspose.Excel

Email SuperDisc problems to pcplus.support@futurenet.co.uk

LINUX DISTRIBUTION

FULL ISO

Mepis Linux 3.2



A Debian based distro you can start using even while it's still installing

REQUIREMENTS

CPU 100MHz or faster
RAM 128MB minimum
OS n/a

SERIAL CODE

Not required

UPGRADE

This is everything you need to try Linux on your machine.

www.mepis.org

There's no shortage of live Linux distributions at the moment, with Knoppix still the flavour of choice out on the web. Yet it's always good to have alternatives, and Mepis is easily one of the best. As with other live distros, simply dropping it into your drive and switching on the power is enough to get started. We've found it a lot better at finding network connections than Knoppix, if a bit slower.

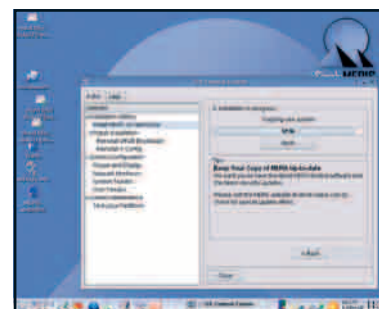
Everything you'll need to do is password protected. To log into the 'demo' account, the password is 'demo'. If you're asked for your root password, it's 'root'. If you install to your hard drive, change these immediately!

One of Mepis' most immediately useful features is that as a Debian-based distribution, you have Synaptic on hand to manage your components, and a rock-solid distribution to get working on. That said, the kernel has

been changed, so don't expect every last patch and Debian package to work without a hitch.

You can use Mepis' dual functionality to get it onto your page. Simply boot it up as a Live CD and check out the territory, then open the Mepis menu, repartition your drive with Qparted, install it to your hard drive, and reboot to try it out. Installation is quick and easy, and you can keep working in the background if you're not excited by the advice messages the set-up program displays.

Until you install everything to your machine, many of the tools on offer (such as the Personal Information Manager, Kontact) are going to be of limited use. Everything saved in RAM is destroyed as soon as you reboot your PC. In the event of trouble later on, you can use your bootable Mepis disc to recover your system. **PCP**



You'll find the Mepis menu by clicking the 'K' button at the bottom right of the screen. The root password is ... 'root'.

FURTHER INFORMATION



Visit www.mepis.org to get all the latest updates, FAQs and other information you may need.

Email SuperDisc problems to pcplus.support@futurenet.co.uk

QSetup Installation Suite

AS SOLD FOR £53

QSetup Installation Suite 4.0.1.0 has everything you need to produce a professional set-up routine. You can configure the interface and installed files, choose the dialogs to be displayed, and add shortcuts and file associations, all with a set-up overhead of only about 200KB

The QSetup Installation Suite goes beyond simply unpacking a few files into preset locations, and includes an Execution Engine to provide the flexibility you need for just about any PC configuration. Here's how to use it to customise your next installation.

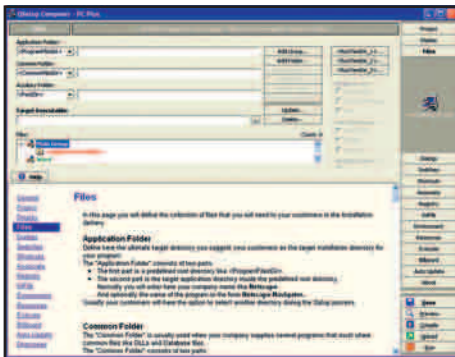
1 The basics QSetup breaks the installation-building process down into 14 different groups, each of which is available from the right-hand menu on the main 'Composer' screen. Click Project | New Project, give your project a name, and fill in the other details.

The other major dialog is 'Files', where you define exactly which files will be delivered onto the user's PC. Start here by defining 'Groups', which represent separate chunks of your application. An office suite may include a core group, another for a word processor, and a third for a spreadsheet. Each group can be included (or not) in the 'Typical', 'Compact' or 'Custom' installation, according to your needs.

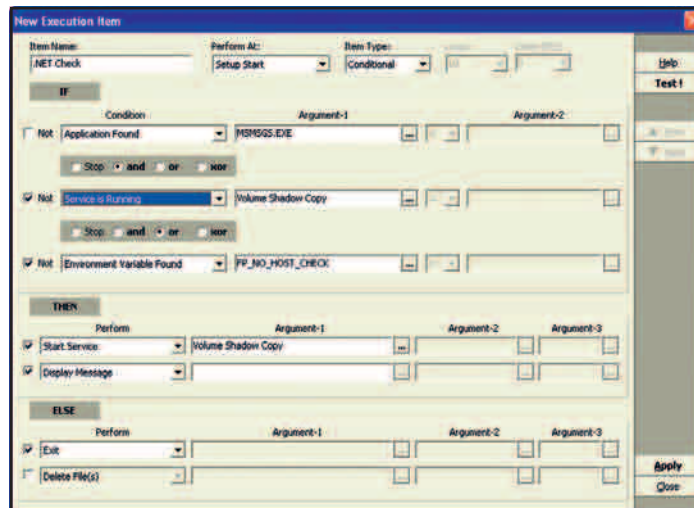
Once the groups are defined, populate them with the files and folders that will make up your application. Click 'Check Dependency..' to scan your executables, and produce a list of the DLLs, OCXs and other files you need. Click 'Add Files' to include them in your installation.

2 Simple installation tweaks

Completing the 'Project' and 'Files' dialogs is enough to get you a working installer, but, of course, you'll be relying heavily on the default settings. It's much better to spend another minute



Most of the QSetup dialogs are crammed with features, but context-sensitive help is just one click away.



Your installer can perform different actions depending on the user's PC configuration: from operating system version to running programs and services, and more.

or two customising what's on offer to get the exact results you need.

Click the 'Dialogs' button to control the screens your user will see during installation. Should you warn them to 'Close all programs' before installing? Do you have a Licence or Readme file to display? Do you want them to enter a username, company name, serial number? It's all controlled from here.

There are plenty of ways to customise your user's system, too. Shortcuts are very easy. Whether you're adding them to the Start menu, Desktop, Send To, Startup or Quick Launch folders, they're all easily defined in a few clicks.

It's just as straightforward to add file associations, Registry or Ini file entries and Environment variables. You can choose to optionally leave them behind when uninstalling, which is potentially useful as a security measure.

3 Execution Engine

What if some users are short on RAM, don't have the required version of something, or aren't running a service you require? What you really need is a way to customise the installation according to whatever

system variables are important to you, and that's what the Execution Engine enables you to do. Click 'Execute', then 'Add Item' to define the condition you would like to examine. The list includes looking for the presence (or absence) of a file, folder or application, checking for programs or services that are running right now, examining Registry values, finding the ADO or .NET Framework version number, and more.

Multiple conditions can be combined, with the program performing a particular action depending on whether they're true or false (it's an "If... Then... Else..." construct). And this can be anything from adding a log entry to a text file, running a new executable to cope with the situation, or aborting the installation altogether.

It's a flexible solution, but QSetup doesn't stop there. If you need even more conditions or execution options, they can be added through a custom DLL. Check the QSetup Help for details on the functions you must export. **PCP**

FURTHER INFORMATION



Here's how to install the Microsoft Data Engine, useful if your app needs SQL Server. Go go: support.microsoft.com/manuals/en/lanselm4/installingmicrosoftdataengine.msde.htm

Email SuperDisc problems to **pcplus.support@futurenet.co.uk**

REQUIREMENTS

CPU 500MHz or faster
RAM 128MB minimum
OS Windows 98 or later

SERIAL CODE

Click the right-hand 'About' button, follow the registration link to **www.pantaray.com/pcplus2.html**, and enter the key it provides in the Registration Code box.

UPGRADE

Save 25%

Version 6 of QSetup Installation Suite features a host of improvements to its installation capabilities. High on the list comes support for Windows 2003, the addition of PAsV mode to the FTP client, and a smaller set-up delivery size. TLB files can now be registered from the Files page, there's a range of blue background designs for your installer, and you can choose a compression level for your finished file.

The Execution Engine has come a long way, too, with new commands to check for specific running applications, and detect the version of major applications and system components (Access, SQL/MSDE, Media Player, DirectX). Version 6 also includes variable support, giving your installation scripts much more power and versatility.

Pantaray hasn't even told us what new goodies are going to be in the next version, due for release around the time you read this. We do know the planned price is \$299 for the Pro version, though, and \$99 for QSetup Lite, but as a PC Plus reader you qualify for a 25 per cent discount. Simply email register@pantaray.com with your registration code, and you'll receive a discount coupon by return of email.

www.pantaray.com

REGISTRY CLEANER

AS SOLD FOR £16

Registry Mechanic 3

This system optimiser scans your Registry, locating and fixing corrupt or redundant entries



Registry Mechanic 3 quickly scans for trouble and fixes any problems it finds.

and that's it your work is complete.

But wait. Full Registry scans can take a while, so what if you don't have a few minutes to spare? Or maybe you're cautious about using a new

tool and want to limit what it can do?

Whatever your reasons, it's not a problem. Registry Mechanic also displays a list of 'Sections to scan', like 'Fonts' or 'Add/Remove Programs'. Select the ones you would like to scan and the others will be ignored.

Windows applications have a habit of writing information to the Registry, then leaving it there. Your Registry gets more bloated, consuming system resources and slowing you down. Until you run Registry Mechanic, that is.

1 Define the scan Getting started with Registry Mechanic isn't difficult. Launch the program, then click Scan

2 Display and repair As the scan does its work, Registry Mechanic displays a running total of the various

issues it discovers, highlighted in a handy list. Scroll down and double-click on any area of interest for further information on the issue.

If you're happy that you want all issues to be fixed, click 'Repair'. You can't selectively fix individual problems with this version, so either accept all the fixes or none at all.

There's still no particular reason to worry about letting Registry Mechanic go to work, as long as you make backups before each repair. In the unlikely event that you do encounter a problem, use the 'Backup' option and your Registry will be restored. **PCP**

REQUIREMENTS

CPU 66MHz or faster
RAM 16MB minimum
OS Windows 98 or later

SERIAL CODE

Visit www.pctools.com/registry-mechanic/free/pcplusuk

UPGRADE

Save 20%

Upgrade to Registry Mechanic 4 and you'll see benefits like faster scanning algorithms, and the ability to repair individual problems detected in a scan. System Restore points can automatically be created immediately before a repair, and the program can now scan and repair the Registry each time you boot.

The cost of Registry Mechanic 4 ranges from \$30 (£16) for a single computer to \$999 (£530) for a site licence (up to 50 PCs). Use our special coupon code **PCPlusUK20** and you'll qualify for 20 per cent discount.

www.pctools.com

FURTHER INFORMATION



Optimise your Registry even more by defragmenting it with the free PageDefrag (www.sysinternals.com/ntw2k/freeware/pagedefrag.shtml)

Email SuperDisc problems to pcplus.support@futurenet.co.uk

ANTI-SPYWARE TOOL

AS SOLD FOR £16

Spyware Doctor 3



Not only can this program remove spyware, it prevents the pests reinfecting your PC



Spyware Doctor displays full details of every threat it detects on your PC.

from dodgy 'freeware' you find online. However careful you think you've been, it's important to check for infection right away. Click 'Start Full Scan' and leave Spyware Doctor to

work. Once complete you'll see a list of all the detected threats. Select any you want to remove (or click 'Check all'), then click 'Delete checked' to get rid of them.

2 Immunise and block Malignant ActiveX controls are often used by rogue websites to compromise your PC. IE can be told not to run these controls,

but how do you find out which ones they are? The simple answer: you don't. Spyware Doctor already knows. Click Status | Immunize Your Computer | Immunize Now to immediately protect you from known threats.

3 Active protection Now you're safe, but what if the next program you install comes with an unwanted spyware payload? No need to leave it till your next scan, there's an easier way. Click 'OnGuard' on the left-hand side and check 'Activate OnGuard'. Spyware Doctor will now automatically monitor your cookies, removing problems almost as soon as they appear. **PCP**

FURTHER INFORMATION



Find out more about the inner workings of spyware (and how to remove it) at the excellent Spyware Guide (www.spywareguide.com)

Email SuperDisc problems to pcplus.support@futurenet.co.uk

REQUIREMENTS

CPU 66MHz or faster
RAM 128MB minimum
OS Windows 98 or later
OTHER 8MB disk space, Internet Explorer 5.5, Windows Script and Windows Script Control for Windows 98/Me users (see Help)

SERIAL CODE

Visit www.pctools.com/spyware-doctor/free/pcplusuk/

UPGRADE

Save 20%

Spyware authors keep adding new tricks to catch you out, but Spyware Doctor has its own sophisticated new features for keeping you safe.

Spyware Doctor 3.2 is normally priced at \$30 (£16) for a single user licence but, as a PC Plus reader, you qualify for a special deal. Quote the coupon code **PCPlusUK20** and you'll get an extra 20 per cent discount.

www.pctools.com

Most spyware detectors rely on you running occasional scans, but not this one. Follow our instructions and you'll benefit from three layers of protection, keeping you safe virtually all of the time.

1 Remove existing threats

Spyware usually sneaks in unnoticed, often installed without your permission